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COMMERCIAL FISHERIES REVIEW

VOL. 26, NO. 10 OCTOBER 1964

UNITED STATES DEPARTMENT OF THE INTERIOR
Fish and Wildlife Service
Bureau of Commercial Fisheries
Washington, D.C.

DEPOSITED BY THE
UNITED STATES OF AMERICA

UNITED STATES
DEPARTMENT OF THE INTERIOR
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COMMERCIAL FISHERIES REVIEW

A review of developments and news of the fishery industries
prepared in the BUREAU OF COMMERCIAL FISHERIES.

Joseph Pileggi, Editor
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Use of funds for printing this publication has been approved by the Director of the Bureau of the Budget, May 1, 1963.

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COVER: The Canadian schooner Bluenose II (with her sails down) docked at Gloucester's State Fish Pier on July 2, 1964, for a 4-day visit. Bluenose II is a replica, only a year old, of Canada's famous racing schooner. Her predecessor, made famous in international fishermen's races years ago, is pictured on the Canadian dime. Bluenose II made her first United States port call in Gloucester in connection with the International Dory Races, and then sailed to Boston and on to the World's Fair in New York City where she was on display for 10 days. (See outside back cover of this issue for photograph of vessel with her sails up.)

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FISH SWIMMING SPEEDS

Two University of California (at Los Angeles) scientists, using a magnetic "speedometer" attached to a fishing rod, measured the speed of a yellowfin tuna at about 45 miles per hour. A wahoo, a mackerel-like fish, swam up to 48 miles per hour. Zoologists previously have been of the opinion that fish seldom ever swam faster than 27 m.p.h. (Pacific Marine Fisheries Commission Newsletter, July 1, 1964.)

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* * * * *

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For sale by the Superintendent of Documents, U. S. Government Printing Office, Washington, D.C. 20402
Price 60 cents (single copy). Subscription Price: $6.50 a year; $2 additional for foreign mailing.

COMMERCIAL FISHERIES REVIEW

October 1964 Washington, D.C. Vol. 26, No. 10

COMPARISON OF SALMON CATCHES IN MONOFILAMENT AND MULTIFILAMENT GILL NETS--Part II

By Herbert A. Larkins*

ABSTRACT

The second phase of a monofilament-multifilament gill-net study was completed by the U. S. Bureau of Commercial Fisheries during the 1963 summer field season. Salmon catches in standard multifilament nets were compared with those in an all-monofilament net unit. Results of a 1962 study, in which multifilament nets were compared with alternate monofilament-multifilament nets, are also examined in an analysis of efficiency and cost of three gill-net combinations.

Sockeye catches in all-monofilament nets were greater than in all-multifilament, but chum and pink catches were the same in both gear types, as were the lengths of all species. In terms of cost and efficiency, the alternated combination appeared superior for the capture of high-seas salmon followed by all-multifilament and all-monofilament.

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INTRODUCTION

In the salmon research program in the North Pacific Ocean and Bering Sea by the U. S. Bureau of Commercial Fisheries, one facet of the work has been an investigation into more efficient sampling gear. Much of the Bureau's research, in support of the United States Section of the International North Pacific Fisheries Commission, has required relatively large numbers of salmon specimens for racial analysis and relative abundance and distribution studies.

The capture of pelagic salmon on the high seas has been accomplished with surface gill nets. To provide adequate samples of each species and age group, the length of the net string has gradually been increased to over $1\frac{1}{2}$ miles. Increasing the length of the string has resulted in an increase in manpower as well as gear damage and loss from sudden changes in weather, whales, and shipping. In addition, inshore fishing stations in the Aleutian Island chain, an area of considerable interest, are difficult to sample with a long gill-net string because of its susceptibility to tangling in the severe tidal currents near the islands.

The apparent success reported by the Japanese high-seas commercial salmon fishery with monofilament gill nets stimulated Bureau scientists to investigate the relative efficiency of monofilament netting and its potential as a research-sampling tool.

In the first phase of the study, conducted during the 1962 summer field season (reported in the May 1963 Commercial Fisheries Review), the catches in standard multifilament nets were compared with those in the monofilament nets of an experimental unit of alternate mono-

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filament-multifilament nets of like mesh size and construction. The results of that phase indicated a significantly larger catch in the monofilament nets and, in general, provided samples directly comparable to those of the multifilament nets in terms of age and length of the fish (Larkins 1963).

Fig. 1 - The Bureau of Commercial Fisheries research vessel George B. Kelez.

The results of the second phase of the study, in which the standard multifilament nets were tested against an experimental unit of all-monofilament nets, are reported here. This experiment, completed during the 1963 summer cruise of the Bureau's research vessel George B. Kelez (fig. 1), was also designed to permit a three-way comparison between all-multifilament, alternate multifilament-monofilament, and all-monofilament net combinations.

METHODS AND MATERIALS

The multifilament nets, each 50 fathoms long and 4 fathoms deep, were made of type 330 nylon. The mesh sizes used were the same as in past years: $5\frac{1}{4}$, $4\frac{1}{2}$, $3\frac{1}{4}$, and $2\frac{1}{2}$ inches (stretched measure). The webbing, dyed dark green, was "hung in" 50 percent on the cork and lead lines.

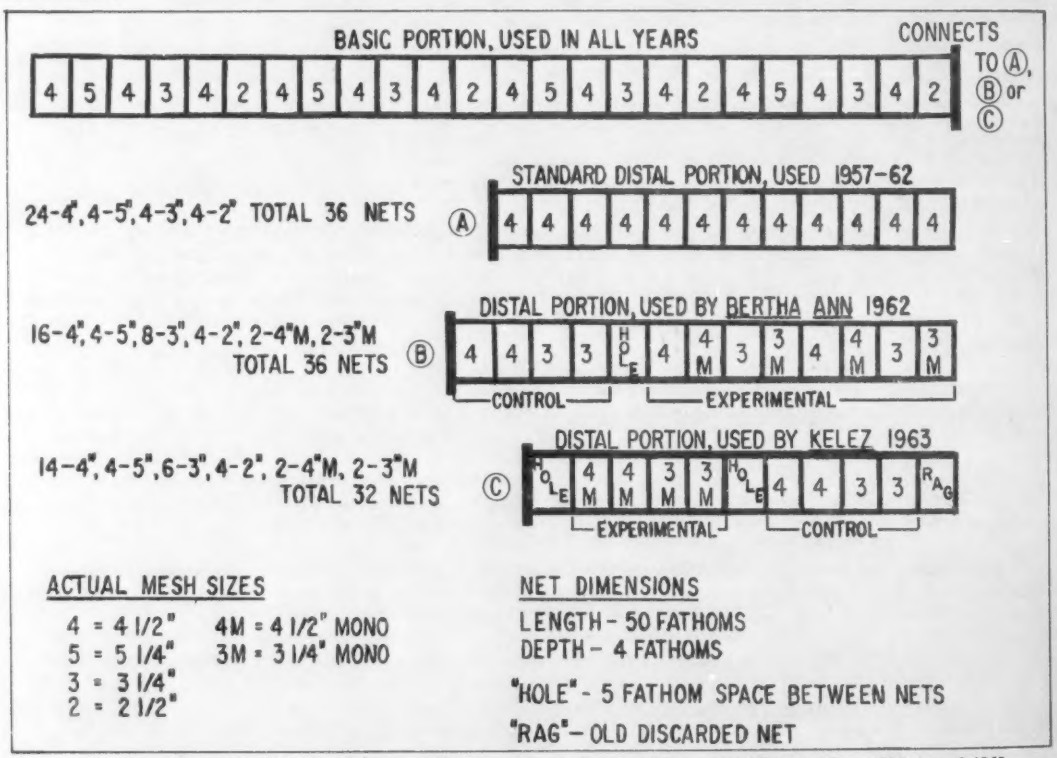
BASIC PORTION, USED IN ALL YEARS
CONNECTS TO Ⓐ, Ⓑ or Ⓒ
4 5 4 3 4 2 4 5 4 3 4 2 4 5 4 3 4 2 4 5 4 3 4 2
24-4", 4-5", 4-3", 4-2" TOTAL 36 NETS
Ⓐ
STANDARD DISTAL PORTION, USED 1957-62
4 4 4 4 4 4 4 4 4 4 4 4
16-4", 4-5", 8-3", 4-2", 2-4"M, 2-3"M TOTAL 36 NETS
Ⓑ
DISTAL PORTION, USED BY BERTHA ANN 1962
4 4 3 3 HOLE 4 4M 3 3M 4 4M 3 3M
CONTROL
EXPERIMENTAL
14-4", 4-5", 6-3", 4-2", 2-4"M, 2-3"M TOTAL 32 NETS
Ⓒ
DISTAL PORTION, USED BY KELEZ 1963
HOLE 4M 4M 3M 3M HOLE 4 4 3 3 RAG
EXPERIMENTAL
CONTROL
ACTUAL MESH SIZES
4 = 4 1/2" 4M = 4 1/2" MONO
5 = 5 1/4" 3M = 3 1/4" MONO
3 = 3 1/4"
2 = 2 1/2"
NET DIMENSIONS
LENGTH - 50 FATHOMS
DEPTH - 4 FATHOMS
"HOLE" - 5 FATHOM SPACE BETWEEN NETS
"RAG" - OLD DISCARDED NET

Fig. 2 - Composition of high-seas salmon gill nets used by the Bureau of Commercial Fisheries from 1957 through 1963.

Table 1 - Comparison of Gross Catches in Monofilament and Multifilament Gill Nets, 1963

Set Number	Date	3½-Inch Multifilament									3½-Inch Monofilament								
		No. of Sockeye	No. of Chum	No. of Pink	Total No.	No. of Nets	Catch Per Net (Number)			Total Catch Per Net (No.)	No. of Sockeye	No. of Chum	No. of Pink	Total No.	No. of Nets	Catch Per Net (Number)			Total Catch Per Net (No.)
							Sockeye	Chum	Pink							Sockeye	Chum	Pink	
1	7/3	5	2	1	8	6	0.8	0.3	0.2	1.3	1	1	0	2	2	0.5	0.5	0	1.0
2	7/4	5	4	0	9	6	0.8	0.7	0	1.5	2	5	0	7	2	1.0	2.5	0	3.5
3	7/5	0	0	0	0	6	0	0	0	0	0	0	0	0	2	0	0	0	0
4	7/7	6	10	0	16	6	1.0	1.7	0	2.7	15	0	0	15	2	7.5	0	0	7.5
5	7/8	8	5	0	13	6	1.3	0.8	0	2.2	2	2	0	4	2	1.0	1.0	0	2.0
6	7/9	11	19	0	30	6	1.8	3.2	0	5.0	4	10	1	15	2	2.0	5.0	0.5	7.5
7	7/10	5	5	0	10	6	0.8	0.8	0	1.7	0	0	0	0	2	0	0	0	0
8	7/11	14	0	1	15	6	2.3	0	0.2	2.5	1	0	0	1	2	0.5	0	0	0.5
9	7/15	6	5	0	11	6	1.0	0.8	0	1.8	1	1	0	2	2	0.5	0.5	0	1.0
10	7/17	45	7	0	52	6	7.5	1.2	0	8.7	16	2	0	18	2	8.0	1.0	0	9.0
11	7/18	80	5	0	85	6	13.3	0.8	0	14.2	36	1	0	37	2	18.0	0.5	0	18.5
12	7/19	21	1	0	22	6	3.5	0.2	0	3.7	8	0	0	8	2	4.0	0	0	4.0
13	7/20	94	9	0	103	6	15.7	1.5	0	17.2	41	1	0	42	2	20.5	0.5	0	21.0
14	7/23	109	3	1	113	6	18.2	0.5	0.2	18.8	65	0	0	65	2	32.5	0	0	32.5
15	7/26	426	6	0	432	6	71.0	1.0	0	72.0	235	2	0	237	2	117.5	1.0	0	118.5
16	7/29	No monofilament																	
17	7/30	48	2	0	50	6	8.0	0.3	0	8.3	27	3	1	31	2	13.5	1.5	0.5	15.5
18	7/31	41	5	0	46	6	6.8	0.8	0	7.7	34	1	0	35	2	17.0	0.5	0	17.5
19	8/2	4	5	0	9	6	0.7	0.8	0	1.5	0	3	0	3	2	0	1.5	0	1.5
20	8/3	89	4	0	93	6	14.8	0.7	0	15.5	37	3	0	40	2	18.5	1.5	0	20.0
21	8/4	85	2	0	87	6	14.2	0.3	0	14.5	100	3	0	103	2	50.0	1.5	0	51.5
22	8/5	No monofilament																	
23	8/11	No monofilament																	
24	8/12	39	4	0	43	6	6.5	0.7	0	7.2	12	6	0	18	2	6.0	3.0	0	9.0
25	8/13	35	10	0	45	6	5.8	1.7	0	7.5	11	3	0	14	2	5.5	1.5	0	7.0
26	8/14	11	3	0	14	6	1.8	0.5	0	2.3	2	4	0	6	2	1.0	2.0	0	3.0
27	8/15	Net string rolled																	
28	8/18	No monofilament																	
29	8/19	No monofilament																	
30	8/20	No monofilament																	
31	8/22	No monofilament																	
32	8/23	No monofilament																	
33	8/24	No monofilament																	
34	8/27	22	10	0	32	6	3.7	1.7	0	5.3	8	4	0	12	2	4.0	2.0	0	6.0
35	8/28	41	22	0	63	6	6.8	3.7	0	10.5	10	4	0	14	2	5.0	2.0	0	7.0
36	8/29	26	81	1	108	6	4.3	13.5	0.2	18.0	18	17	0	35	2	9.0	8.5	0	17.5
37	8/30	19	17	0	36	6	3.2	2.8	0	6.0	10	6	0	16	2	5.0	3.0	0	8.0
38	8/31	23	9	0	32	6	3.8	1.5	0	5.3	11	1	0	12	2	5.5	0.5	0	6.0
39	9/1	Net string rolled																	
40	9/2	19	1	0	20	6	3.2	0.2	0	3.3	9	2	0	11	2	4.5	1.0	0	5.5
41	9/4	16	0	0	16	6	2.7	0	0	2.7	16	0	0	16	2	8.0	0	0	8.0
42	9/9	No monofilament																	
43	9/11	No monofilament																	
Total		1,353	256	4	1,613	180	7.5	1.4	-	8.96	732	85	2	819	60	12.2	1.4	-	13.65
		4½-Inch Multifilament									4½-Inch Monofilament								
1	7/3	4	1	5	10	14	0.3	0.1	0.4	0.7	2	2	4	8	2	1.0	1.0	2.0	4.0
2	7/4	18	8	4	30	14	1.3	0.6	0.3	2.1	3	2	1	5	2	1.0	1.0	0.5	2.5
3	7/5	0	0	0	0	14	0	0	0	0	0	0	0	0	2	0	0	0	0
4	7/7	10	1	2	13	14	0.7	0.1	0.1	0.9	5	0	0	5	2	2.5	0	0	2.5
5	7/8	26	4	9	39	14	1.9	0.3	0.6	2.8	9	3	3	15	2	4.5	1.5	1.5	7.5
6	7/9	24	15	86	125	14	1.7	1.1	6.1	8.9	7	4	31	32	2	3.5	2.0	10.5	16.0
7	7/10	3	8	7	18	14	0.2	0.6	0.5	1.3	0	1	1	2	2	0	0.5	0.5	1.0
8	7/11	20	2	6	28	14	1.4	0.1	0.4	2.0	4	1	3	8	2	2.0	0.5	1.5	4.0
9	7/15	1	8	1	10	14	0.1	0.6	0.1	0.7	1	3	1	5	2	0.5	1.5	0.5	2.5
10	7/17	69	19	7	95	14	4.9	1.4	0.5	6.8	17	2	2	21	2	8.5	1.0	1.0	10.5
11	7/18	163	22	5	190	14	11.6	1.6	0.4	13.6	41	4	0	45	2	20.5	2.0	0	22.5
12	7/19	8	14	0	22	14	0.6	1.0	0	1.6	3	3	0	6	2	1.5	1.5	0	3.0
13	7/20	64	16	1	81	14	4.6	1.1	0.1	5.8	8	3	0	11	2	4.5	1.0	0	5.5
14	7/23	42	3	1	45	14	3.0	0.1	0.1	3.2	20	3	0	23	2	10.0	1.5	0	11.5
15	7/26	213	27	4	244	14	15.2	1.9	0.6	17.4	37	3	2	42	2	18.5	1.5	1.0	21.0
16	7/29	No monofilament																	
17	7/30	94	33	6	133	14	6.7	2.4	0.4	9.5	9	2	0	11	2	4.5	1.0	0	5.5
18	7/31	89	40	2	131	14	6.4	2.9	0.1	9.4	16	5	0	21	2	8.0	2.5	0	10.5
19	8/2	17	84	0	101	14	1.2	6.0	0	7.2	2	5	0	7	2	1.0	2.5	0	3.5
20	8/3	95	20	0	115	14	6.8	1.4	0	8.2	20	5	0	25	2	10.0	2.5	0	12.5
21	8/4	81	67	0	147	14	5.8	4.8	0	10.5	40	4	0	44	2	20.0	2.0	0	22.0
22	8/5	No monofilament																	
23	8/11	No monofilament																	
24	8/12	48	23	0	71	14	3.4	1.6	0	5.1	6	3	0	9	2	3.0	1.5	0	4.5
25	8/13	48	40	0	88	14	3.4	2.9	0	6.3	6	3	0	9	2	3.0	1.5	0	4.5
26	8/14	11	52	0	63	14	0.8	3.7	0	4.5	5	8	0	13	2	2.5	4.0	0	6.5
27	8/15	Net string rolled																	
28	8/18	No monofilament																	
29	8/19	No monofilament																	
30	8/20	No monofilament																	
31	8/22	No monofilament																	
32	8/23	No monofilament																	
33	8/24	No monofilament																	
34	8/27	11	38	0	49	14	0.8	2.7	0	3.5	0	4	0	4	2	0	2.0	0	2.0
35	8/28	31	72	2	105	14	2.2	5.1	0.1	7.5	6	7	0	13	2	3.0	3.5	0	6.5
36	8/29	15	64	0	79	14	1.1	4.6	0	5.6	2	3	0	5	2	1.0	1.5	0	2.5
37	8/30	4	54	0	58	14	0.3	3.9	0	4.1	0	8	0	8	2	0	4.0	0	4.0
38	8/31	31	42	0	73	14	2.2	3.0	0	5.2	1	7	0	8	2	0.5	3.5	0	4.0
39	9/1	Net string rolled																	
40	9/2	16	17	0	33	14	1.1	1.2	0	2.4	1	2	0	3	2	0.5	1.0	0	1.5
41	9/4	77	6	0	83	14	5.5	0.4	0	5.9	6	3	0	9	2	3.0	1.5	0	4.5
42	9/9	No monofilament																	
43	9/11	No monofilament																	
Total		1,333	799	148	2,280	420	3.17	1.90	0.35	5.43	277	102	38	417	60	4.62	1.70	0.63	6.95

The experimental monofilament nets, dyed light grey, were constructed identically with the multifilament nets; only the $4\frac{1}{2}$- and $3\frac{1}{4}$-inch mesh sizes were used. The webbing, of Japanese manufacture, was very similar to the German Perlon used in 1962.

The vessel's net string (fig. 2) was composed of a standard 24 net portion of all-multifilament webbing with varying mesh sizes, an experimental portion consisting of two $3\frac{1}{4}$- and two $4\frac{1}{2}$-inch monofilament nets, and a control portion of two $3\frac{1}{4}$- and two $4\frac{1}{2}$-inch multifilament nets. All nets within each portion were laced together to form a continuous unit and a five-fathom opening was left between each portion so fish could not lead from one unit to another. An old, discarded net "rag" was attached to the end of the string to prevent bunching of the last net.

The 32 net string, equipped with two lighted flag poles and radio buoys, was set shortly after dark, allowed to drift freely through the night, and hauled after dawn. Setting took about 45 minutes, the nets fished for an average of 12 hours, and hauling time varied from $1\frac{1}{2}$ to 3 hours.

The nets were repaired daily and replaced when necessary. Through the season, as the nets became worn, their efficiency was probably somewhat reduced, but the state of repair of the two types of webbing is believed to have been equal at any one time.

Both the basic and control portions of the net strings in 1962 and 1963 were identical, except for the position of the control portion, and from the basis for comparison between the alternated monofilament-multifilament unit in 1962 and the all-monofilament unit in 1963.

RESULTS

The 1963 salmon catches by net type for the $3\frac{1}{4}$- and $4\frac{1}{2}$-inch nets are shown in table 1. Preliminary tests between the total salmon catch per net of the multifilament nets in the basic and control portions of the string over the entire season show no significant differences[1/]. Therefore, all of the $3\frac{1}{4}$- and $4\frac{1}{2}$-inch multifilament nets have been used in the comparison with monofilament catches.

In 73 percent of the $3\frac{1}{4}$-inch and 57 percent of the $4\frac{1}{2}$-inch comparisons, the total catch per unit of effort of the monofilament exceeded that of the multifilament nets; over the season, the $3\frac{1}{4}$-inch monofilament caught 1.5 and the $4\frac{1}{2}$-inch monofilament 1.3 times as many salmon per net as the multifilament.

In the comparison of individual species taken in the two net types, a very interesting difference is apparent. While the relative efficiency of the monofilament nets (table 2) for sockeye and pink salmon was considerably higher than that of the multifilament, the catch per net of chum salmon in the two net types was almost identical. Statistically, only the difference in catch of sockeye salmon between the two net types was significant[2/]. This difference in relative efficiency of monofilament netting for three species indicates that the species composition of catches in the monofilament and multifilament nets was also different.

Table 2 - Catch Per Unit of Effort for All $3\frac{1}{2}$- and $4\frac{1}{2}$-Inch Nets and Relative Efficiency of Monofilament, 1963

Mesh Size	Catch Per Net (Number)								Relative Efficiency of Monofilament (Number)			
	Multifilament				Monofilament							
	Sockeye	Chum	Pink	Total	Sockeye	Chum	Pink	Total	Sockeye	Chum	Pink	Total
Inches												
$3\frac{1}{4}$	7.5	1.4	-	8.96	12.2	1.4	-	13.65	1.6	1.0	-	1.52
$4\frac{1}{2}$	3.2	1.9	0.4	5.43	4.6	1.7	0.6	6.95	1.4	0.9	1.8	1.28

1/Paired "t" tests: $3\frac{1}{4}$-inch mesh nets: $t = 1.04$ with 29 d.f.

$4\frac{1}{2}$-inch mesh nets: $t = 0.48$ with 29 d.f.

2/Paired "t" tests: $3\frac{1}{4}$-inch mesh nets: sockeye, $t = -2.3$ with 29 d.f.; chum, $t = -0.02$ with 29 d.f.

$4\frac{1}{4}$-inch mesh nets: sockeye, $t = -2.1$ with 28 d.f.; chum, $t = 0.8$ with 28 d.f.; pink, $t = -1.6$ with 14 d.f.

The relationship between the individual sockeye catches in the two net types was linear[3/], at least over the range of abundance encountered in 1963.

Length frequency curves of sockeye and chum salmon taken in the two net types are similar (fig. 3) and their mean lengths (table 3) are not significantly different[4/] indicating that the monofilament and multifilament gill nets had the same intraspecies selection properties. These results also infer that, length being a function of ocean-age (Larkins 1963), both net types captured similar proportions of the available ocean-age groups.

Table 3 - Mean Lengths of Salmon Captured in Monofilament and Multifilament Gill Nets, 1963

Species	Mesh Size	Monofilament	Multifilament
	Inches	. . . . . (Centimeters)	
Sockeye	3¼	38.26	37.59
	N=	733	2,155
	4½	50.30	49.40
	N=	269	1,531
Chum	3¼	40.09	39.43
	N=	86	591
	4½	51.85	50.90
	N=	101	1,275

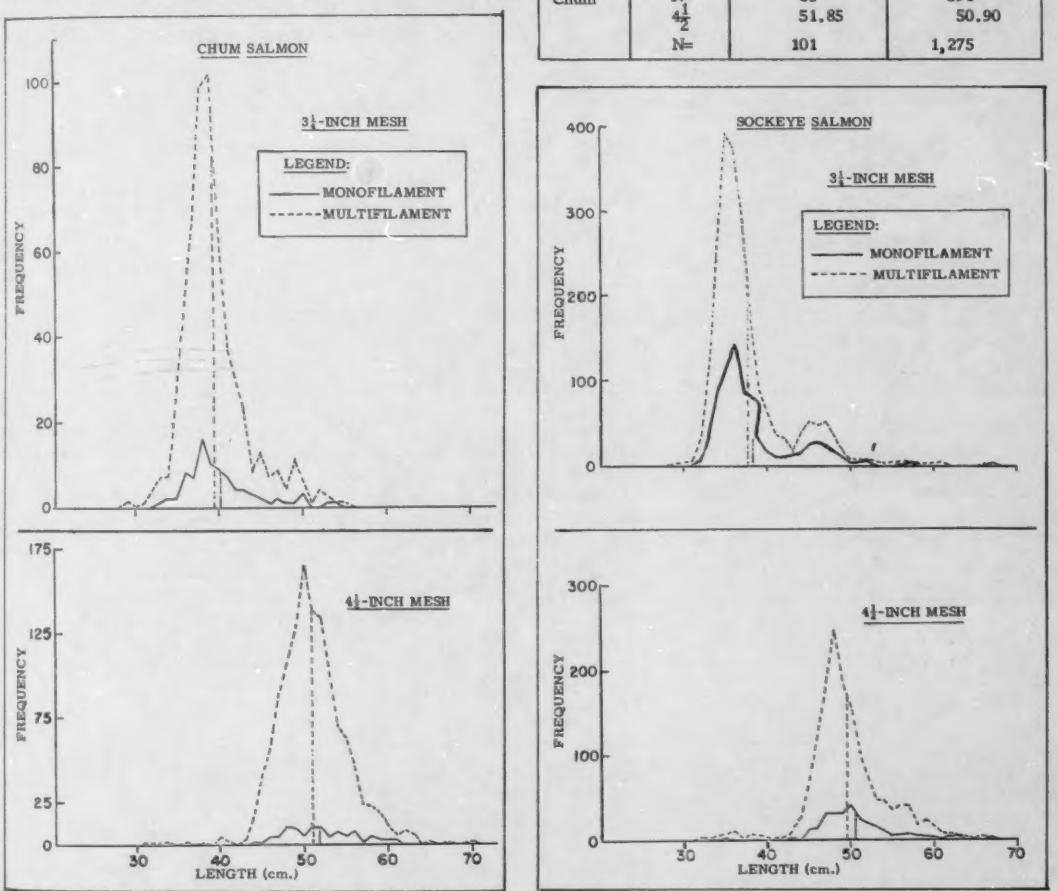

Fig. 3 - Comparison of salmon length-frequencies from monofilament and multifilament gill nets.

3/ 3¼-inch mesh nets: r = 0.97; test for b = 0, t = 19.25 with 27 d.f.
4½-inch mesh nets: r = 0.86; test for b = 0, t = 58.52 with 27 d.f.

4/ Sockeye: 3¼-inch mesh nets: F = < 1.0 with 1, 2,886 d.f.
4½-inch mesh nets: F = <1.0 with 1, 1,798 d.f.

Chum: 3¼-inch mesh nets: F = < 1.0 with 1, 875 d.f.
4½-inch mesh nets: F = < 1.0 with 1, 1,374 d.f.

DISCUSSION

To summarize the preceding section, it was shown that the sockeye catches in an all-monofilament gill-net section were significantly greater than in an all-multifilament string, although the catches of chum and pink salmon were, apparently, the same in both net types. The length and age compositions of monofilament catches were the same as those of multifilament catches.

Results of the 1962 study (Larkins 1963), in which alternate monofilament-multifilament nets were used, also showed no difference in age and length comparisons between the net types; however, the catches of all three species were considerably larger in the monofilament nets than in the multifilament. It was also shown that the salmon catches in the multifilament nets adjacent to the monofilament were significantly lower than in the other multifilament nets of the net string; however, additional analysis has indicated that the total catch per unit of alternate monofilament-multifilament nets was still much greater than in an equal section of all-multifilament netting (table 4).

Table 4 - Salmon Catch Per Net in Alternate Monofilament-Multifilament and All-Multifilament Gill Nets, 1962

Mesh Size	Species	Catch Per Net (Number)				Relative Efficiency of Alternate Unit
		Alternate Unit			All-Multifilament	
		Monofilament	Multifilament	Average of Alternate Unit		
Inches						
$3\frac{1}{4}$	Sockeye	19.41	4.72	12.07	6.44	1.87
	Chum	5.22	1.28	3.25	1.21	2.69
	Pink	0.12	0.06	0.09	0.05	1.80
	Total	24.76	6.06	15.41	7.70	2.00
$4\frac{1}{2}$	Sockeye	10.45	3.62	7.04	4.60	1.53
	Chum	3.22	1.36	2.29	1.36	1.68
	Pink	1.92	1.02	1.47	0.74	1.99
	Total	15.59	6.00	10.80	6.70	1.61

In the two phases of the experiment, three combinations of the two gear types were tried; all-multifilament in 1962 and 1963, alternated monofilament in 1962, and all-monofilament in 1963. By relating the catch per unit of effort of the two experimental types to that of the all-multifilament portion for each year, all three types of gear may be ranked by their relative efficiency. This proportional comparison is independent of changes in salmon abundance within or between years.

Table 5 - Relative Efficiency and Relative Cost of Multifilament, Monofilament, and Alternate Multifilament-Monofilament Gill Nets

	Symbol	Species	Multifilament		Alternate Nets		Monofilament	
			$3\frac{1}{4}$"	$4\frac{1}{2}$"	$3\frac{1}{4}$"	$4\frac{1}{2}$"	$3\frac{1}{4}$"	$4\frac{1}{2}$"
(a) Relative efficiency	w	Sockeye	1.0	1.0	1.9	1.5	1.6	1.5
		Chum	1.0	1.0	2.7	1.7	1.0	0.9
		Pink	1.0	1.8	1.8	2.0	-	1.8
		Total	1.0	1.0	2.0	1.6	1.5	1.3
(b) Relative cost[1/]	x		1.0	1.0	1.3	1.3	1.6	1.6
(c) Relative life[2/]	y		1.0	1.0	0.75	0.75	0.5	0.5
(d) Relative cost/year (x/y)	z		1.0	1.0	1.8	1.8	3.2	3.2
(e) Relative cost year/fish ($^2/_w$)		Sockeye	1.0	1.0	0.9	1.2	2.0	2.1
		Chum	1.0	1.0	0.7	1.1	3.2	3.6
		Pink	1.0	1.0	1.0	0.9	-	1.8
		Total	1.0	1.0	0.9	1.1	2.1	2.5
(f) Relative length of string necessary to catch N fish ($^1/_w$)		Sockeye	1.0	1.0	0.5	0.7	0.6	0.7
		Chum	1.0	1.0	0.4	0.6	1.0	1.1
		Pink	1.0	1.0	0.6	0.5	-	0.6
		Total	1.0	1.0	0.5	0.6	0.7	0.8

1/Based on 55 percent higher initial cost for monofilament.
2/Based on 50 percent shorter life for monofilament.

Table 5 (a) portrays the relative efficiency of the three gear units and it is apparent that, regardless of species or mesh size, the alternate monofilament-multifilament string had the highest catch per unit of effort, the all-monofilament moderate, and the all-multifilament the lowest.

Our limited experience with monofilament netting has shown that the initial cost of a finished net is about 55 percent greater than multifilament and, because of the difficulty in repairing monofilament webbing, its life is approximately 50 percent that of multifilament. By combining those factors (table 5 (b), (c)) with the relative efficiency of the three net types, an index of the cost per year per fish has been determined (table 5 (e)). The reciprocal of the relative efficiency (table 5 (f)) is a measure of the relative amount of gear necessary to capture an equivalent number of fish in the three types of gill-net strings.

A comparison of the relative cost per year per fish with the length of a net string necessary to catch equivalent numbers of fish (table 5(e), (f)), allows a final determination of efficiency versus cost. Alternate multifilament-monofilament nets provided the same number of salmon as all-multifilament with about one-half ($3\frac{1}{4}$-inch mesh 0.5, $4\frac{1}{2}$-inch mesh 0.6) of the effort and at almost the same relative cost per fish ($3\frac{1}{4}$-inch mesh 0.9, $4\frac{1}{2}$-inch mesh 1.1). Although the all-monofilament gear caught equal numbers of fish with only about three quarters ($3\frac{1}{4}$-inch mesh 0.7, $4\frac{1}{2}$-inch mesh 0.8) of the amount of gear, the relative cost per sample was over twice that of all-multifilament nets ($3\frac{1}{4}$-inch mesh 2.1, $4\frac{1}{2}$-inch mesh 2.5).

CONCLUSIONS

Based on the results of both the 1962 and 1963 phases of this study, the use of monofilament gill nets, either alone or alternated with multifilament nets, provided salmon samples of identical length and age composition as multifilament nets of the same mesh size; however, different proportions of sockeye, chum and pink salmon were taken in the two net types.

Monofilament nets captured more salmon than multifilament, especially when used as alternate monofilament-multifilament gear (alternated with multifilament nets). The relative efficiency of the three gear types tested was highest for alternate monofilament-multifilament, moderate for all-monofilament, and lowest for all-multifilament. Because of the higher initial cost and shorter life of the monofilament webbing, the cost per fish was highest for all-monofilament, moderate for all-multifilament, and lowest for alternate monofilament-multifilament. Therefore, in terms of cost and numbers of salmon captured, the alternate combination appears to have been the superior of the three tested for high-seas salmon fishing.

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LARKINS, HERBERT A.
1963. Comparison of Salmon Catches in Monofilament and Multifilament Gill Nets. Commercial Fisheries Review, vol. 25, no. 5 (May), pp. 1-11. (Sep. No. 675.)

CORRECTION

In the August 1964 issue, page 7, the heading should have read: "CHANGES in Abundance of the Marine Worm, GLYCERA DIBRANCHIATA, Associated with Seawater Temperature Fluctuations."

WEIGHTS AND MEASURES ACTIVITIES IN THE USDI FISHERY PRODUCTS STANDARDS AND INSPECTION PROGRAMS

By J. R. Brooker*

BACKGROUND

The complexities of today's processing and distribution of food demand that there be some acceptable document between buyer and seller to facilitate orderly marketing. Standards are a yardstick to measure the quality of a product. They thus constitute the needed common measuring device upon which buyer and seller can base their contracts.

Those standards are composed of two or more levels of product quality designated by grades, and are also composed of other related factors--such as class, style, or condition--that may affect the economical use and the desirability of the product. Accordingly, national quality standards tend to improve the overall quality and uniformity of the products being standardized. The consumer thus gains by getting better quality, and the industry in turn gains by creating greater demand for its products.

United States Standards for Grades of Quality for Fish and Fishery Products help to define the level of quality for those food products. The standards are voluntary and reflect the desire of the fishing industry to improve its product quality. The Bureau of Commercial Fisheries of the U. S. Department of the Interior (USDI) has developed and promulgated U. S. Standards for Grades for 14 fishery products in the past 6 years. Those standards were developed with the aid of the fishing industry.

U. S. Standards for Grades of Fishery Products Developed and Promulgated by the U. S. Bureau of Commercial Fisheries	
1. Frozen fried fish sticks	8. Raw headless shrimp
2. Raw breaded shrimp	9. Raw breaded fish portions
3. Fish blocks	10. Ocean perch fillets
4. Haddock fillets	11. Fried scallops
5. Halibut steaks	12. Fried fish portions
6. Cod fillets	13. Breaded fish sticks
7. Salmon steaks	14. Flounder and sole fillets

The standards, of course, would have no value as acceptable documents between buyer and seller unless the grading of the products according to the standards were done by a neutral party. Since 1958 the Bureau of Commercial Fisheries has therefore operated a Voluntary Inspection Service for fishery products. This service has grown steadily. In 1963, for example, over 215 million pounds of fishery products were inspected and certified. That quantity of inspected products represents about one-third of all the domestically processed fishery products for human consumption, exclusive of canned fish.

Proper labeling of packaged fishery products not only is required by law but also is essential in marketing them. As part of the inspection program, the USDI accordingly reviews labels for fishery products that are to bear the USDI shield.

To show the role of weights and measures activities in the USDI Fishery Products Standards and Voluntary Inspection programs, the following three main subjects must be considered:

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Note: A paper presented at the 49th National Conference on Weights and Measures, Washington, D. C. June 17, 1964.

U. S. DEPARTMENT OF THE INTERIOR
Fish and Wildlife Service
Sep. No. 711

1. Relation of weights and measures to the development of the Quality Standards.
2. Relation of weights and measures to the Voluntary Inspection Service.
3. Relation of weights and measures to label approval.

RELATION OF WEIGHTS AND MEASURES TO QUALITY STANDARDS DEVELOPMENT

The Bureau's program of standards development goes beyond product standardization of such aspects as quality and wholesomeness because two additional important aspects are also considered: (a) the packaged product with regard to size, volume, net weight, amount delivered, or the number of units per measure, and (b) the amount of fish or shellfish ingredients contained in certain fabricated or processed products. In our consideration of those two aspects, we encountered problems relating to glaze and breading.

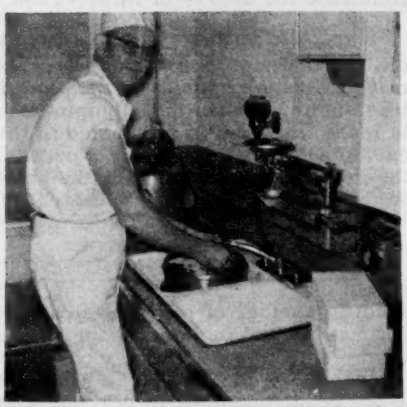
PROBLEM OF GLAZE: Four fishery products for which U.S. standards were developed presented a problem of ice glaze. Those products were halibut steaks, salmon steaks, sole and flounder fillets, and raw headless shrimp.

In the usual market form, those products are protected by a surface glaze of ice in addition to the packaging materials in which they are contained. To determine how much product is actually present, we had to develop and incorporate into the standards a specific procedure for determining the net weight. A slightly different procedure was required for each of the four products because of inherent differences.

In the standard for frozen halibut steaks, the consideration of glaze is unique in that excessive glaze is treated as a factor of quality. The maximum allowable amount of glaze to protect the product was established at 6 percent of the net weight. Beyond that percentage, it is considered to be excessive glaze, and the product is downgraded for quality.

PROBLEM OF BREADING: Another fishery-products category that required special consideration was breaded and precooked products. That group includes breaded fish sticks, breaded shrimp, breaded fish portions, fried fish sticks, and fried fish portions. A problem of the "utility" of the packaged contents was encountered in developing those standards. This problem involved two factors: (1) loose breading, and (2) excessive breading.

Loose Breading: During the processing of breaded and precooked products, any loosely adhering breading is usually removed by passing the products over a vibrating large-mesh stainless-steel wire belt. When, however, samples of those products were obtained at the distribution level for evaluation during the early stages of developing the standards, substantial amounts of loose breading were, in some instances, found in the package. This indicated either that good commercial practices had not been exercised in the processing of the product by eliminating the loose breading, or that loose breading was being added to meet the net-weight requirements when the weight of the contents were slightly under the declared net weight.



USDI Inspector debreading shrimp to determine the percentage of shrimp material.

This problem was resolved in the Standards for Breaded and Precooked Products by categorizing large amounts of loose breading as a factor of quality. Those standards deduct points, depending upon the amount of loose breading remaining in the package. The unit of measure used for determining excessive breading is the teaspoon. Less than $\frac{1}{2}$ teaspoon of

loose breading is considered to be a "small amount"; and over ½ teaspoon is considered to be a "large amount."

Excessive Breading: USDI Standards of Quality establish levels for the amount of fish meat required in breaded and precooked fishery products. The Bureau of Commercial Fisheries believes that it has a responsibility to the consumer to see that he gets a proportionately large amount of fish or shellfish ingredient in the breaded-type products.

In establishing the level of fish or shellfish content for a given product, we take a number of factors into consideration. The factors most frequently evaluated are flavor, appearance in both the raw and cooked states, texture, and the industry's capability evidenced by what has been marketed in the past.

Amounts of Fish or Shellfish Required in Breaded Products by USDI Standards

Breaded Product	Relative Amount of Fish or Shellfish Required
	Percent
Fish portions	75
Fish sticks	72
Fried fish portions	65
Fried fish sticks	60
Fried scallops	60
Shrimp	50

When standards are developed for breaded products, a technique is also developed for determining the amount of the fish or shellfish ingredient that is present. This method, incorporated into the standard, involves the removal of the breading and a determination of the percentage of fish or shellfish ingredient by weight. The levels of the principal ingredient established in USDI Standards are given in the table.

RELATION OF WEIGHTS AND MEASURES TO VOLUNTARY INSPECTION SERVICE

Continuous inspection of processing operations is the major type of inspection services performed by the U. S. Department of the Interior (USDI). Under this type of service, the principal duties of the USDI inspector include (a) inspecting for plant sanitation, (b) examining the raw material for quality, (c) checking the processing technique, (d) determining the quality of the end product, and (e) certifying the product.

In the execution of all but the first of those duties, the USDI inspector is concerned with some aspect of weight or measurement. A review of the pertinent duties (b through e) will illustrate the degree of involvement of the inspector in weighing or measuring.

EXAMINING THE RAW MATERIAL: If we visit the breaded shrimp industry for a specific example of how the inspector examines incoming raw material, we find that the raw material usually comes to the plant in the form of 5-pound cartons of block-frozen raw headless shrimp. When those shipments arrive at the processing plant and before a settlement is made, the firm is interested in the quality of the shrimp and whether or not each 5-pound carton will actually deliver 5 pounds. The USDI inspector samples the shipment, examines the product, and determines the net weights of the selected packages, using the official method defined in the Quality Standard. The information he thus obtains is then provided to the firm and is used as a basis for a decision by the firm to accept or reject the shipment.

CHECKING THE PROCESSING TECHNIQUE: During the processing of products such as fish sticks and fish portions, the inspector frequently conducts line checks of the weight of a specific number of raw sticks or portions. This information is used as a guide to continuous product control in determining whether the amount of fish meat is adequate. To produce, for example, a 1-pound package of fish portions containing four 4-ounce pieces, the 4 unbreaded pieces of fish must weigh a minimum of 12 ounces in order for the final product to conform to the requirement of 75 percent of fish meat. Frequent weighing of 4 random pieces provides the information that the input weight of raw material is adequate and that the net weight will probably be adequate, since the batter and breading can be controlled very closely.

DETERMINING THE QUALITY OF END PRODUCT: End-product examination for quality by the inspector includes a determination of the amount of the product in the package. Samples for examination are drawn randomly during production in accordance with a sampling

plan so as to be representative of the lot. The net contents of each package is determined using the method defined in the U. S. Standard for the product being examined. The net content of each package is reported on the inspector's work sheet along with the other pertinent information found during the examination. An average calculated from the net weight of the individual packages indicates whether or not the lot complies with the net weight declared on the label.

CERTIFYING THE PRODUCT: In the certification procedure for fishery products, the pertinent information about the examined lot is recorded on an official inspection certificate. Those certificates of findings are admissible in all courts of the country as prima facie evidence. Two types of information about the contents of the packaged product are always given when fishery products are certified: (a) the net content as declared on the label, and (b) the determined average net content of the examined packages as observed by the inspector. When the net contents of one or more packages are found to deviate beyond the range of good commercial practice, such deviations are noted on the certificate for the benefit of the processor or buyer of the lot.

RELATION OF WEIGHTS AND MEASURES TO LABLE APPROVAL

Fishery product labels that are to bear inspection marks of the USDI must be reviewed and approved by the Bureau of Commercial Fisheries prior to use. The primary reason for reviewing the labels is to ensure that whatever reference is made to USDI inspection--either through a grade shield, inspection shield, or statement of inspection--is accurate and in accordance with USDI regulations.

The second reason for reviewing the labels is to ensure that USDI inspection marks will not be affixed to a label that is in violation of the mandatory requirements of the U. S. Food, Drug, and Cosmetic Act. The presence of a statement of net contents is one of several items that we ensure is on the label. However, it should not be construed that the USDI is determining that labels comply with the U. S. Food and Drug Act. Rather, it should be considered that this thorough label review is a service to the industry.

Although the USDI review program includes verification that the label bears a quantity statement, guidelines as to the prominence and placement of the quantity statement on the label have not been developed. This is a regulatory matter and is beyond the Bureau's authority. We believe, however, that this question of prominence and placement should be nationally coordinated with the various industry groups having an interest in it and that a single set of guidelines or regulations should be developed and adopted at all levels of government that regulate this activity.

In the past, the Bureau of Commercial Fisheries has cooperated fully with other governmental agencies and with industrial organizations where common interest exist. The Bureau plans to continue this policy of cooperation in the future. When difficulties or inconsistencies of any nature are encountered with fishery products, we suggest that the matter be brought to our attention.

Created in 1849, the Department of the Interior--a department of conservation--is concerned with the management, conservation, and development of the Nation's water, fish, wildlife, mineral, forest, and park and recreational resources. It also has major responsibilities for Indian and Territorial affairs.

As the Nation's principal conservation agency, the Department works to assure that nonrenewable resources are developed and used wisely, that park and recreational resources are conserved for the future, and that renewable resources make their full contribution to the progress, prosperity, and security of the United States--now and in the future.

TRENDS AND DEVELOPMENTS

Alaska

FOREIGN FISHING ACTIVITY OFF ALASKA, JULY 1964:

Soviet fishing activity decreased substantially in the waters off Alaska during July 1964. The same period in 1963 saw a general reduction in Soviet fishing efforts on Alaskan fishing grounds. However, while only about 50 Soviet vessels were active in 1964, nearly 200 Soviet vessels were in the same area a year earlier.

Japanese activity in the eastern Bering Sea was down to 4 factoryships and their catcher vessels. With the sale of Prince William Sound salmon to Japanese fishing companies, a number of vessels (including 5 stern trawlers) were diverted to that area to load fish.

U.S.S.R.: The major Soviet fishery off Alaska in July was the trawl fleet operating alternately between Albatross and Portlock Banks near Kodiak. That fleet was harvesting primarily Pacific ocean perch, with virtually no incidental species taken. Fleet gradually decreased and in July consisted of about 50 vessels of all types.

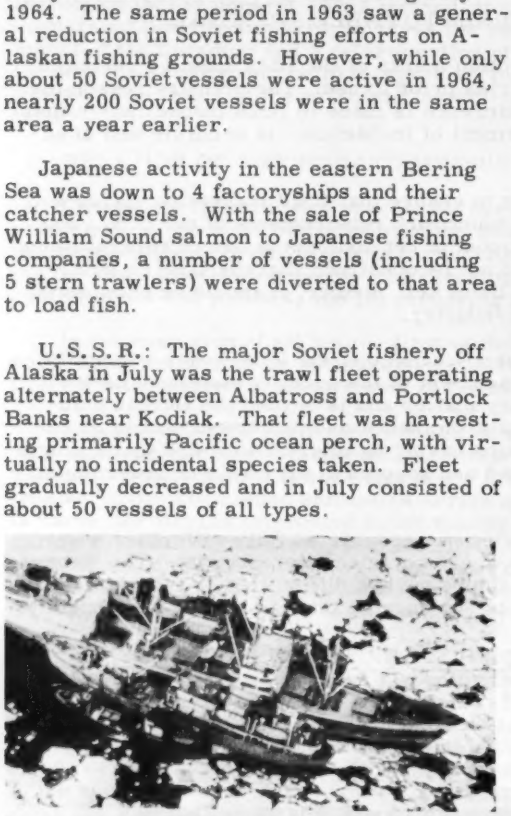


Fig. 1 - Soviet fishery transport vessel surrounded by factoryship and fishing vessels in the Bering Sea during early spring.

Three Soviet whale factory vessels and their accompanying killer vessels continued to operate in the Alaska area during the month. Their operations were farther offshore than in previous years and hence outside United States patrol areas.

Japan: Eastern Bering Sea fishing activities by the Japanese were also reduced during July, as one of the remaining fish meal factoryships moved progressively northwest toward Siberia. The remaining fish meal and freezer vessel, with 28 trawlers, was last reported fishing in the vicinity of the Pribilof Islands.

The Japanese shrimp factoryship Einin Maru, accompanied by 12 trawlers, continued operations north of the Pribilofs during July.

Fig. 2 - Catch aboard a Japanese trawler operating in North Pacific and Bering Sea.

Three Japanese whaling fleets were operating from the vicinity of the Shumagin Islands westward along the Aleutian Chain during the month.

Only two Japanese vessels continued to fish in the Gulf of Alaska during July. The Tenryu Maru and the Kohoku Maru No. 2 were fishing for shrimp off Sitkalidak Island while the other vessels fishing in that area were diverted to Cordova to load salmon.

* * * * *

BRISTOL BAY RED SALMON RUN FAILS:

The 1964 Bristol Bay red salmon fishery was officially labeled a disaster by the Alaska Department of Fish and Game. It was reported that the Naknek-Kvichak district had "absolutely failed." Preliminary data indicated that the Naknek segment was up to expectations and that the Kvichak River system accounted for the failure. All other major systems in the Bay produced reasonably close to the return forecast.

The predicted run for Bristol Bay had been placed at 17.4 million reds. Preliminary figures showed the run was slightly less than 11 million fish and was about equally divided between catch and escapement.

The 1963 Bristol Bay catch of 2.5 million red salmon was the lowest ever previously recorded for that area, and was also declared a complete failure.

* * * * *

SALMON WASTE UTILIZATION:

Over the past few years increasing use has been made of salmon waste for food, pharmaceutical, and bait purposes. Salmon eggs were processed at several Alaska canneries this year as red caviar under Japanese technical supervision and for export to Japan. For that product, eggs are removed after the fish are headed, then transported in open mesh baskets to the packing plant where they are salt-cured. The eggs are first washed in salt water to remove most blood and slime. They are then placed in a saturated brine solution (containing mild-cure salt plus certain color additives) and agitated mechanically for 20 minutes. Egg skeins are then sorted, trimmed, and graded for packing under very close Japanese supervision. A solid pack is made by layering individual skeins of eggs in polyethylene-lined wooden boxes with a modest sprinkling of salt between layers. Apparently the salt at that stage is not measured. Each box holds 10 kilos (22 pounds). After packing, the boxes are cured at room temperature for about one week, again inspected, and then placed in storage at 40° F. for shipment to Japan.

At some plants milts are separated at the same time that eggs are removed from the salmon. Those are placed in 55-gallon drums and treated with 7 gallons of caustic soda solution (5 pounds per gallon) as a preservative and as a first step in their processing. These are used in the production of certain pharmaceutical products.

Significant amounts of salmon heads and tails are also set aside and sold for halibut bait in locations where the halibut fleet sells or takes on bait. The traditional preparation of salmon eggs for sport fishing bait continues to expand each year.

While some Alaska canneries do not prepare any of those byproducts, it is estimated that $\frac{1}{4}$ to $\frac{1}{3}$ of the salmon waste in Alaska will be processed and sold this year.

* * * * *

FILING OF FISHERY DISASTER LOAN APPLICATIONS ENDED SEPTEMBER 30, 1964:

The last date for the acceptance of applications using the Alaskan disaster criteria for fishery loans from the U. S. Bureau of Commercial Fisheries was September 30, 1964. Those special loans were made at 3 percent interest to eligible applicants for the repair or replacement of commercial fishing vessels or fishing gear damaged or lost as a result of the March 27, 1964, Alaskan earthquake or tidal wave.

Note: See Commercial Fisheries Review, July 1964 p. 8.

Alaska Fisheries Exploration and Gear Research

EXPLORATORY FISHING FOR SHRIMP AND SCALLOPS:

Exploratory fishing for shrimp was continued by the U. S. Bureau of Commercial Fisheries chartered exploratory vessel Paragon with coverage as of July 1964 extending from Kodiak Island west to Unimak Pass and including the Shumagin Islands. Catches of over 2,000 pounds in a half-hour trawl drag have been recorded. Both flat and semiballoon 40-foot Gulf of Mexico shrimp trawls were used. Pink shrimp accounted for about 80 to 85 percent of the catches with varying amounts of side-stripe and coon-stripe showing on occasion. Exploratory drags using an eight-foot scallop dredge were made in numerous bays and channels in the Shumagin Islands area. Only a few scattered scallops were located; the largest catch being 16 medium scallop in a half-hour tow in Pavlof Bay. The vessel

Paragon was scheduled to move into the Bering Sea and Bristol Bay during August and September.

Alaska Fisheries Investigations

PINK SALMON NURSERY AREAS DISCOVERED:

The M/V Heron, accompanied by the 20-foot reconnaissance-catcher vessel Blue Boat, completed an 11-day cruise (July 7-17, 1964) through all major channels in northern Southeast Alaska and West Sumner Strait. The cruise was the second of a series to trace seaward migrations of juvenile salmon as they move through summer nursery areas to the Gulf of Alaska. The cruise was highly successful as weather conditions were ideal and all gear worked perfectly. Four major summer nursery areas were discovered and all observed salmon populations were easily sampled by round haul seine from Blue Boat. Catches ranged from several hundred to many thousands per set. The success of this project in observing and capturing samples from major populations of migrating pink salmon represents an important breakthrough in Alaskan pink salmon research, and will lead to a much better understanding of mortality after leaving the stream.

Major concentrations of juvenile pink, chum, and coho salmon were discovered in:

(1) West Kuiu Island from Saginaw Bay to Gedney Harbor, with the population centered in Pillar Bay;

(2) Central Chatham Strait from Takatz Harbor to east Peril Strait, centered in Kelp Bay;

(3) West Icy Strait from Lisianski Inlet to Idaho Inlet, centered around Inian Islands;

(4) West Summer Strait from south Kelp Strait to Louise Cove, centered around Port Beauclerc.

Length-frequency measurements of pink and chum salmon from various locations showed that there are significant differences between size of fish from different areas. Those differences will be useful in later identifying populations in catches by the M/V Commander, a Fisheries Research Institute vessel which was scheduled to begin sampling for juvenile salmon along the outside coast of Baranof Island about August 1. Icy Strait and central Chatham Strait juvenile pink salmon were the smallest, ranging in body length from 79 to 88 millimeters (3.1-3.5 inches); West Kuiu Island pinks ranged from 91 to 106 millimeters (3.6-4.2 inches); and West Sumner Strait pinks were from 112 to 136 millimeters (4.4-5.4 inches).

Atlantic Fisheries Technological Conference

MEETING ON OCTOBER 11-14, 1964:

The eighth annual Atlantic Fisheries Technological Conference was held at Martha's Vineyard, Mass., on October 11-14, 1964. The meeting was attended by United States and Canadian fishery scientists from industry, research institutes, universities, and Government agencies.

More than 50 papers were offered; topics included sanitation problems in fisheries, preservation techniques, research programs and applications, quality measurements, and economics.

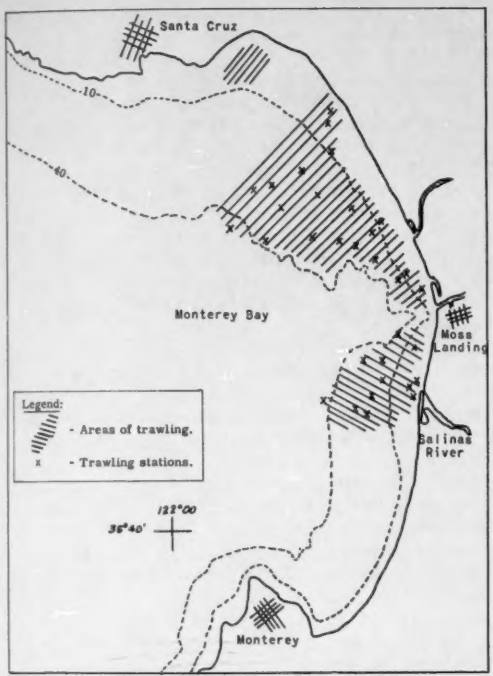
California

GROWTH STUDIES OF ENGLISH SOLE IN MONTEREY BAY:

M/V "Nautilus" Cruises 64-N-1a (February 4-7, 1964), 64-N-1b (April 7-10), 64-N-1c (June 9-12): To collect adult and juvenile English sole (Parophrys vetulus) in Monterey Bay in the vicinity of Moss Landing for use in a growth analysis study was the objective of these cruises by the California Department of Fish and Game research vessel Nautilus.

A $1\frac{1}{4}$-inch mesh Gulf of Mexico shrimp otter trawl with a 1-inch mesh cod-end was used. Trawling was conducted on both sides of the Monterey Canyon in depths of 3 to 50 fathoms with each tow lasting about 20 minutes.

A total of 34 tows was made during the three cruises. Of the fish taken, the sex of 593 English sole was determined and they were also measured. These fish ranged from



Shows trawling areas of Nautilus Cruise 64-N-1a-b-c.

96 to 456 millimeters in length (about 3.8 to 18.0 inches). An interopercle bone was taken from two fish of each sex in each centimeter group to be used for age determinations.

A sex determination was also made on samples of petrale sole (Eopsetta jordani) and Dover sole (Microstomus pacificus) taken during these cruises, together with their measurements.

Note: See Commercial Fisheries Review, February 1964 p. 12.

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PELAGIC FISH POPULATION SURVEY CONTINUED:

M/V "Alaska" Cruise 64-A-3-Pelagic Fish (May 4-24, 1964): This cruise by the California Department of Fish and Game research vessel Alaska was conducted in the coastal waters of northern and central California between Crescent City and Monterey, and in the vicinity of Avila. The main objectives of the cruise were to:

1. Survey the pelagic environment in the northern parts of the present northern an-

Fig. 1 - Fishing area of Alaska during Cruise 64-A-3-Pelagic Fish.

chovy (Engraulis mordax) and Pacific sardine (Sardinops caeruleus) ranges.

2. Assess the density, age, and size composition of the anchovy population in Monterey Bay.

3. Collect anchovies for subpopulation studies.

4. Collect juvenile salmon for the Ocean Salmon Project.

Sampling was accomplished with a large midwater trawl fished from the surface to a depth of 20 fathoms, with each tow lasting from 20 to 40 minutes. The effectiveness of the survey was substantially reduced by the large concentrations of jellyfish (Chrysaora gilbert) which clogged the net, and by the weather which permitted trawling only during daylight hours.

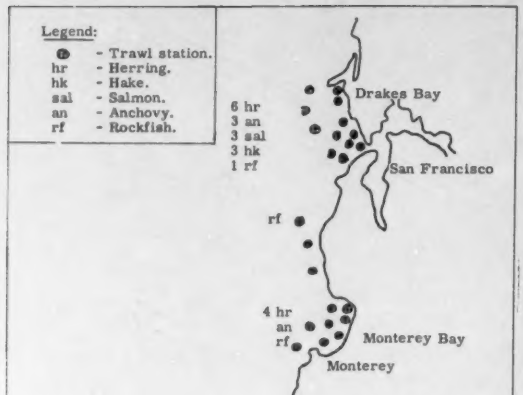

Fig. 2 - Fishing area of Alaska during Cruise 64-A-3-Pelagic Fish.

A total of 45 tows was completed between Crescent City and Monterey and 3 off Avila. The species commonly appearing in the catch with the number of trawls in which they occurred were: Pacific herring (Clupea pallasi) 14 fish, Pacific hake (Merluccius productus) 9, jacksmelt (Atherinopsis californiensis) 9, juvenile king samon (Oncorhynchus tshawytscha) 8, northern anchovy 8, starry flounder (Platichthys stellatus) 7, juvenile rockfish (Sebastodes sp.) 7, juvenile lingcod (Ophiodon elongatus) 6, and surf smelt (Hypomesus pretiosus) 5. Other species occurring less frequently included stickleback (Gasterosteus aculeatus), northern midshipman (Porichthys notatus), sand lance (Ammodytes hexapterus), wolf-eel (Anarrhichthys ocellatus), medusafish (Icichthys lockingtoni), cabezon (Scorpaenichthys marmoratus), whitebait smelt (Allosmerus elongatus), night smelt (Spirinchus starksi), and steelhead trout (Salmo gairdneri).

Pacific herring were caught in the greatest number and occurred most frequently in the catches. They were present in 29 percent of the trawls in numbers ranging from 1 to 15,000. The best catches were made within 2 miles of shore in very turbid water. The areas off the mouth of San Francisco Bay and along the inner part of Monterey Bay were the most productive. Sizes ranged from 37 to 230 millimeters (1.5 to 9.1 inches) standard length with most fish between 55 and 160 millimeters (2.2 to 6.3 inches). The largest catch, however, was comprised of small juveniles 37 to 70 millimeters (1.5 to 2.8 inches).

An adequate survey of the anchovy population was not possible during this cruise because of the necessity of trawling only during daylight hours. Previous experience has indicated that trawling at night is much more effective in sampling anchovies. Small amounts of juvenile anchovies were caught in 3 trawls between Crescent City and Eureka, while adults were caught in 3 trawls near San Francisco, 1 trawl in Monterey Bay, and 1 trawl near Avila. The adults were very large ranging from 135 to 163 millimeters (5.3 to 6.4 inches) long. Samples of the Monterey Bay catch were collected for blood genetic and electrophoretic studies.

Hake catches were spread over most of the survey area. Numbers were quite low, however, with over half of the catches amounting to a single fish; the best catch was 42 fish. Juvenile king salmon were taken off Cape Mendocino, Trinidad Head, and San Francisco. They ranged from 76 to 485 millimeters (3.0 to 19.1 inches) long, with up to 24 fish in a single trawl. Juvenile rockfish of several species were taken in quantity in 2 trawls, with catches of 500 and 4,700 fish, 43-65 millimeters (1.7 to 2.6 inches) long.

Large concentrations of jellyfish were present inshore from Drakes Bay to Monterey Bay. They seriously hampered trawl operations by clogging the net, causing heavy damage to the net and doors. Squid were caught in 7 trawls, with catches of up to 5,600 of them taken in Monterey Bay.

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Airplane Spotting Flight 64-8-Pelagic Fish (May 4-6, 1964): To determine the inshore distribution and abundance of pelagic fish schools, the inshore area from Point Reyes, Marin County, to the United States-Mexican

Border was surveyed from the air by the California Department of Fish and Game's Cessna "182" 9042T.

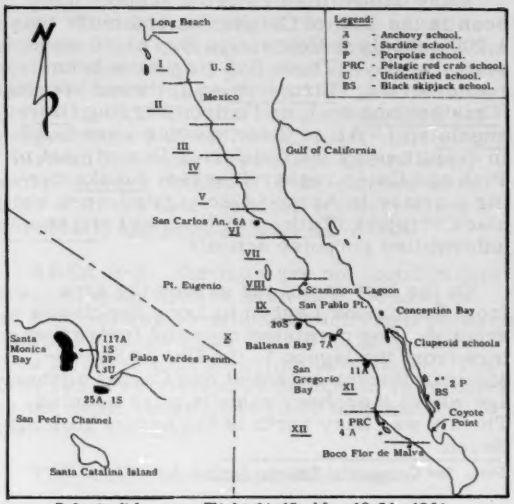
On May 4, the area from Point Reyes to Morro Bay was scouted but water and air visibility were fair to poor. A heavy, brown phytoplankton bloom, in the waters north of Pigeon Point, severely restricted water visibility. In the Monterey Bay area and south, the water was clear but low broken clouds hampered visibility. A total of 8 northern anchovy (Engraulis mordax) schools were sighted near the harbor entrance at Half Moon Bay. A Pacific pilot whale (Globicephala scammoni) and 2 unidentified fish schools were seen near Point Sur. At Monterey 3 purse seiners were setting on a large school of squid (Loligo opalescens) several hundred yards off Cannery Row.

On May 5, the area from Half Moon Bay to Santa Monica was scouted. The sky was overcast and a strong northwest wind was blowing. Water visibility was poor. One unidentified fish school was seen in Monterey Bay actively being worked on by sea birds.

On the last day of the survey the area from from Jalama Park to the United States-Mexican Border was scouted. Rain squalls were encountered near Jalama Park and the Border. Red tide was noted from Redondo Beach to La Jolla--the first big concentration this year. Five anchovy schools were seen in Fish Harbor, a part of the Los Angeles-Long Beach Harbor.

Airplane Spotting Flight 64-10-Pelagic Fish (May 18-21, 1964): To determine the inshore and offshore distribution and abundance of pelagic fish schools, the waters off southern California and Baja California were surveyed from the air by the California Department of Fish and Game's Beechcraft N5614D. The survey covered the offshore waters of southern California in the San Pedro Channel; the inshore waters from Long Beach, Calif., to Boca Flor de Malva, Baja California; and the waters of the Gulf of California from Coyote Point, La Paz Bay to Conception Bay.

This flight by the Beechcraft N5614D was the second of four experimental flights planned for this year along the Baja California coastline. The flights have been scheduled on a quarterly basis.



Pelagic fish survey Flight 64-10, May 18-21, 1964.

The area from San Pedro Channel and Santa Monica Bay was surveyed on May 18. On that day the offshore waters of southern California were covered by fog except for the San Pedro Channel and Santa Monica Bay. School groups of northern anchovies (Engraulis mordax) and two Pacific sardine (Sardinops caeruleus) schools were sighted in Santa Monica Bay and off the Palos Verdes Peninsula. They were the first sardines seen by air spotters in that area since February 1962.

On May 19, the area from Long Beach to Ballenas Bay, Baja California, was surveyed. A low, dense fog prevailed over most of the coastline from Long Beach to Punta Eugenio but south of Punta Eugenio visibility was excellent. A total of 20 sardine schools were sighted near San Pablo Point and 7 anchovy schools were seen in Ballenas Bay.

Punta San Juanico to Boca Flor de Malva, Coyote Point, La Paz Bay to Conception Bay, Gulf of California, were scouted on May 20. Intermittent fog was encountered from Punta San Juanico to Cabo San Lazaro. Visibility was good at Magdalena Bay and throughout the area flown in the Gulf of California. Anchovy schools were seen in San Gregorio Bay and outside Magdalena Bay. A large school of pelagic red crabs (Pleuroncodes planipes), covering an estimated five acres, was sighted in Magdalena Bay.

Many unidentified clupeoid schools were seen in the Gulf of California, and more than 1,000 schools in Conception Bay alone were seen that day. Those fish may have been round herring (Etrumeus sp.), thread herring (Opisthonema sp.), or flatiron herring (Harengula sp.). All of those species were found in quantities by the California Department of Fish and Game research vessel Alaska during a cruise in April. Also sighted were one black skipjack (Euthynnus lineatus) and two unidentified porpoise schools.

On the last day of the survey the area from Scammons Lagoon to Long Beach was scouted. Fog persisted over the inshore waters from the lagoon to the United States-Mexican Border except at San Carlos anchorage where 6 anchovy schools were counted. The air was hazy north of the border to Long Beach.

Note: See Commercial Fisheries Review, June 1964 p. 11.

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SURVEY OF SHRIMP RESOURCES IN NORTHERN AND CENTRAL COASTAL WATERS CONTINUED:

M/V "N. B. Scofield" Cruise 63-S-2-Shrimp (March 29-May 1, 1964): The objectives of this cruise by the California Department of Fish and Game research vessel N. B. Scofield were to:

1. Locate concentrations of pink shrimp (Pandalus jordani) in Areas A, B-1, B-2, and C for population estimates.

2. Determine sizes, sex ratios, and weight of shrimp in each area.

3. Determine escapement of commercial size shrimp through $1\frac{1}{2}$-inch mesh cod-end of net.

4. Make bathythermograph and Nansen bottle casts for bottom temperatures and salinity samples in shrimp areas.

5. Identify, count, and weigh incidentally-caught fish species.

6. Collect specimens of cephalopods for special study.

A total of 139 tows were made in the combined survey areas in the coastal waters from Cape Ferrelo, Oreg., to Pt. Sal, Santa Barbara County, Calif. A 41-foot headrope

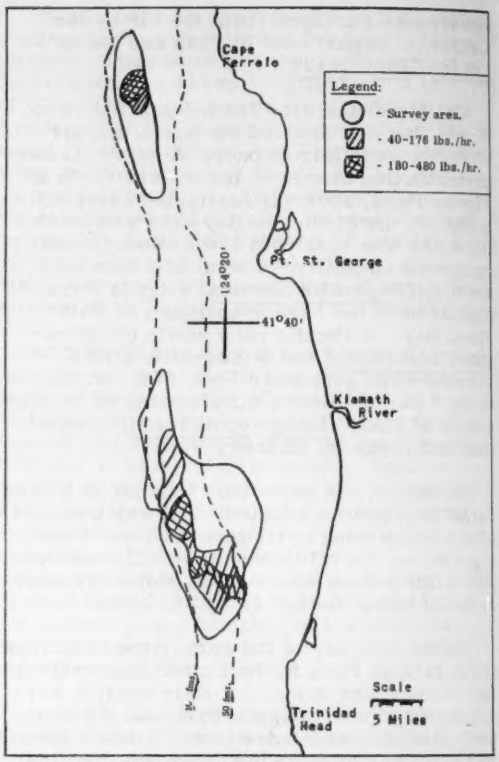


Fig. 1 - M/V N. B. Scofield Cruise 64-S-2, Area A.

Gulf of Mexico otter trawl having $1\frac{1}{2}$-inch stretch mesh in the cod-end was used. Of the 59 tows made in Area A, 39 were made with a $\frac{1}{2}$-inch stretched mesh liner on the cod-end to catch shrimp escaping from the main net. Preliminary analysis of data showed that few commercial size shrimp were lost.

AREA A: Between Cape Ferrelo, Oreg., and Trinidad Head, Calif. (fig. 1), a total of 59 tows of 15 minutes duration each was made in depths of 40 to 94 fathoms. Shrimp were caught at an average rate of 73 pounds an hour, ranging from none to 480 pounds an hour. The population of Area A is estimated to contain 530,000 to 750,000 pounds. Shrimp sizes (heads-on) ranged from 55 to 169 a pound with an average of 125.

The year-class composition was:

Age Group	Percentage by No.	Percentage by Weight
1 (1963)	43	24
11 (1962)	57	75
111 (1963)	Trace	1

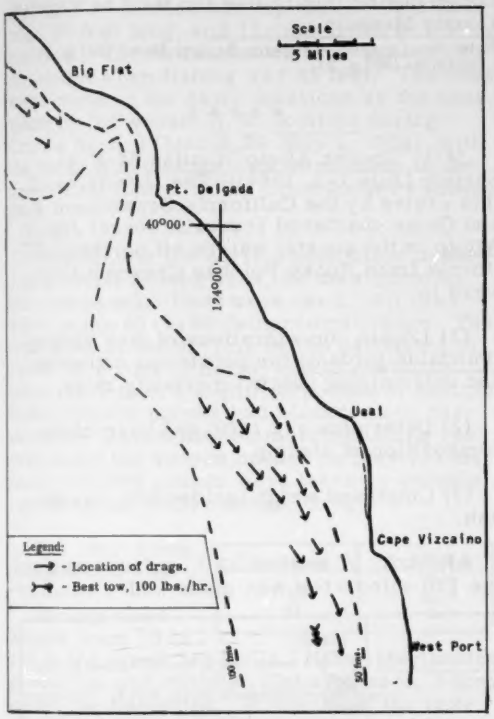


Fig. 2 - M/V N. B. Scofield Cruise 64-S-2, Area B-1.

Only 9 percent of the female shrimp examined were gravid. The incidental fish catch was light, consisting mostly of eulachon (Thaleichthys pacificus), slender sole (Lyopsetta exilis), and rex sole (Glyptocephalus zachirus). Bottom water samples were obtained at 11 stations for salinity determinations. A total of 29 bathythermograph (BT) casts were made. Bottom temperatures ranged from 7.2° to 8.5° C. (45.0° to 47.3° F.); surface temperatures from 8.8° to 10.5° C. (47.8° to 50.9° F.).

An evaluation of the 1964 Area A fishery, made in the fall of 1963 (N. B. Scofield Cruise 63-S-6 and Ocean Shrimp Report for the 1963 season) was accurate. The evaluation forecast a poor season due to weak 1962 and 1963 year-classes. The heavy 1962 landings caused an extreme reduction in the spawning stock. This, it is believed, accounts for the small 1963 year-class.

AREA B-1: A total of 25 tows made from Big Flat to Westport (fig. 2) in 43 to 82 fathoms did not take shrimp in commercial quantities. The best tow yielded 100 pounds an hour. The shrimp ranged from 70 to 110 to the pound and averaged 81 shrimp. Only 1 tow yielded more than 1 pound of shrimp. Surface temperatures ranged from 7.8° to 9.0° C. (46.0° to 48.2° F.) and bottom temperatures ranged from 6.9° to 7.8° C. (44.4° to 46.0° F.). Thirteen BT casts were made and 10 water samples were obtained. Fish catches were light with rex sole, sanddab (Citharichthys sordidus), and slender sole dominant.

AREA B-2: Shrimp were not found in commercial quantities in Area B-2. A total of 46 tows lasting 15-minutes each from Stewarts Point to Bodega Head (fig. 3) in 26 to 72 fathoms failed to locate shrimp in quantity. The best two tows yielded 25 pounds in 15 minutes in the depth range of 44 to 47 fathoms off Duncan's Landing

The year-class composition was:

Age Group	Percentage by No.	Percentage by Weight
1 (1963)	26	15
11 (1962)	74	85

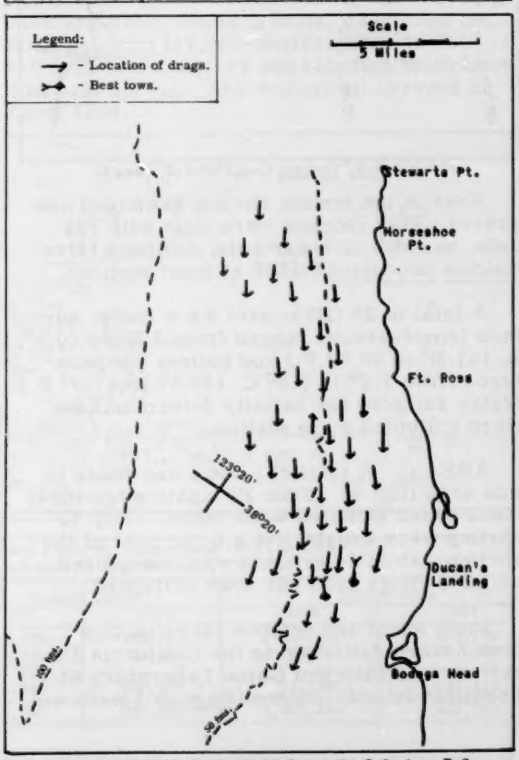


Fig. 3 - M/V N. B. Scofield Cruise 64-S-2, Area B-2.

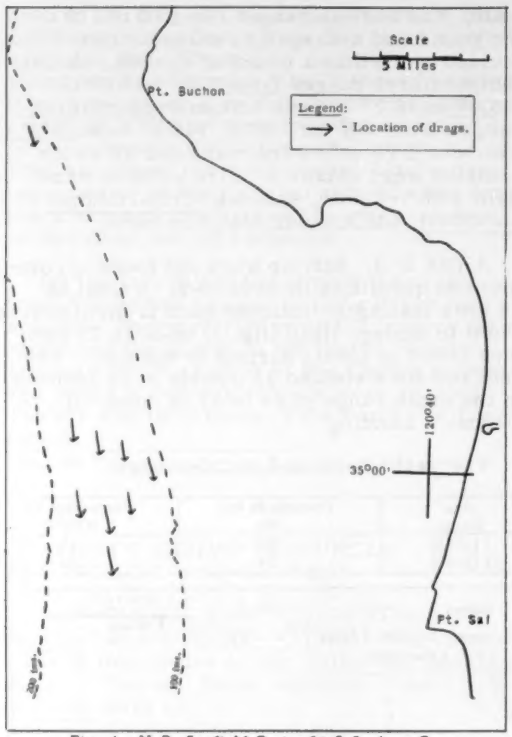


Fig. 4 - N. B. Scofield Cruise 64-S-2, Area C.

None of the female shrimp examined was gravid. Fish catches were light with rex sole, sanddab, slender sole, and hake (Merluccius productus) taken at most stations.

A total of 25 (BT) casts were made; surface temperatures ranged from 8.8° to 10.3° C. (47.8° to 50.6° F.) and bottom temperatures from 7.5° to 8.5° C. (45.5° to 47.3° F.). Water samples for salinity determinations were collected at 14 stations.

AREA C: A total of 9 tows was made in this area (fig. 4). Four BT casts were made and 2 water samples were taken. Only 42 shrimp were caught, but a large part of the shrimp-habitable grounds was unexplored because rough seas cut down activities.

Some squid and octopus taken on this cruise were delivered to the California Department of Fish and Game Laboratory at Terminal Island. Skates (Raja sp.) were collected during this cruise for the Los Angeles County Museum.

Note: See Commercial Fisheries Review, March 1964 p. 14; December 1963 p. 21.

* * * * *

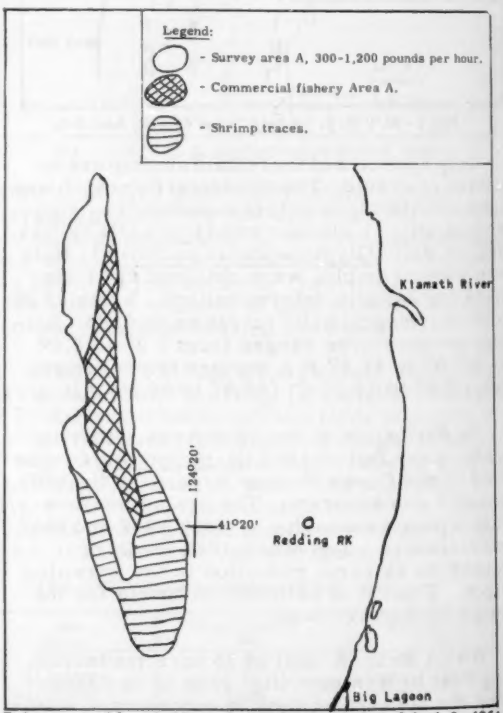
M/V "Joseph Alioto" Cruise 64-C-1-Shrimp (July 1-3, 1964): The objectives of this cruise by the California Department Fish and Game chartered research vessel Joseph Alioto in the coastal waters off northern California from Rocky Point to Crescent City were to:

(1) Locate concentrations of pink shrimp (Pandalus jordani) for population estimates and determining natural mortality rates.

(2) Determine sex ratio and year-class composition of shrimp.

(3) Count and weigh incidentally-caught fish.

AREA A: A total of 22 30-minute tows and one 120-minute tow was made with a commer-



Fishing area of Joseph Alioto during Cruise 64-C-1, July 1-3, 1964.

cial Gulf of Mexico shrimp trawl with a headrope 80 feet long, and 1½-inch mesh in the cod-end. The estimated width of the opening of the net when fishing was 45 feet. The tows were made in the same locations as the tows made by the vessel N. B. Scofield during Cruise 63-S-2 (March 29-May 1, 1964), with the exception that no tows were made in the area being fished by the commercial shrimp fleet.

To estimate the shrimp population in the commercial fishing area, 32 tows made by the commercial fleet were used. All tows were in the 49- to 90-fathom depth range. The total area of the shrimp bed is estimated to cover 50.2 square miles, and to contain a little more than 2.2 million pounds of shrimp. Some 450,000 pounds had already been harvested by California commercial fishing vessels since the season opened on May 1, 1964. About 100,000 pounds were taken by vessels operating out of Brookings, Oreg.

The year-class composition was:

Year-Class	Percentage
I	45.3
II	52.0
III	2.7

Shrimp sizes ranged from 70 to 128 to the pound heads-on. Hake (Merluccius productus) and rockfish (Sebastodes sp.) dominated the fish catch. Stomachs of the hake were full of young-of-the-year shrimp.

Cans--Shipments for Fishery Products, January-June 1964

The amount of steel and aluminum consumed to make cans shipped to fish and shellfish canning plants during January-June 1964 was down 6.4 percent from that used during the same period in 1963. The decline was due partially to a drop in the canning of jack mackerel and Maine sardines.

In January-June 1964, shipments to the Pacific or Western Area accounted for 69.2 percent of total shipments; shipments to the Eastern Area accounted for 26.8 percent; and shipments to the Southern Area accounted for most of the remaining 4.0 percent. Most of the fish-canning facilities are located in the Pacific Area.

Notes: (1) Statistics cover all commercial and captive plants known to be producing metal cans. A "base box" is an area 31,360 square inches, equivalent to 112 sheets 14" x 20" size. Tonnage figures for steel (tinplate) cans are derived by use of the factor 23.5 base boxes per short ton of steel. (In the years 1962 and 1963, tonnage data were based on the factor 21.8 base boxes per short ton of steel.) The use of aluminum cans for packing fishery products is small.

(2) See Commercial Fisheries Review, Sept. 1964 p. 14; July 1964 p. 9.

Caroline Islands

U. S. TUNA FISHING BASE IN PALAU ISLANDS PLANNED:

A United States west coast tuna-canning firm, which plans a tuna fishing and freezing base at Koror, Palau Islands, chartered the M/S Jaglaxmi (17,000-ton freighter) to deliver 610 tons of machinery and supplies to the base this past spring. The equipment arrived in April 1964.

U. S. Domestic Shipments of Metal Cans for Fishery Products, January-June 1963 and 1964
(Base Boxes of Metal Consumed in the Manufacture of Cans for Fishery Products)

Receiving Area	First Quarter		Second Quarter		January-June	
	1964	1963	1964	1963	1964	1963
East[1]	187,707	155,814	173,530	215,924	361,237	371,738
Southern	24,761	21,010	28,390	38,197	53,151	59,207
North Central	492	29	219	5	711	34
West[2]	359,947	381,735	574,448	629,376	934,395	1,011,111
Total all areas	572,907	558,588	776,587	883,502	1,349,494	1,442,090

1/Includes Puerto Rico.
2/Includes Alaska and Hawaii.

The firm's construction engineer arrived in Palau at about the same time to build a 1,500-ton cold-storage and freezer facility, ice-making machines, water-storage tanks, and offices for the new plant which was expected to be operating by July 1964.

Six 25-ton tuna vessels were to begin operating from Koror's main port with 72 Okinawans and 48 Palauans as crew and fishermen.

Under the provisions of the contract signed by Trust Territory officials and the United States firm, Palauans or other Micronesians will be trained as tuna fishermen. Eventually, all of the vessels are to be manned by Micronesians. The Palau Islands are part of the Caroline Islands group in the United States Trust Territory of the Pacific. (Pacific Islands Monthly, May 1964.)

Central Pacific Fisheries Investigations

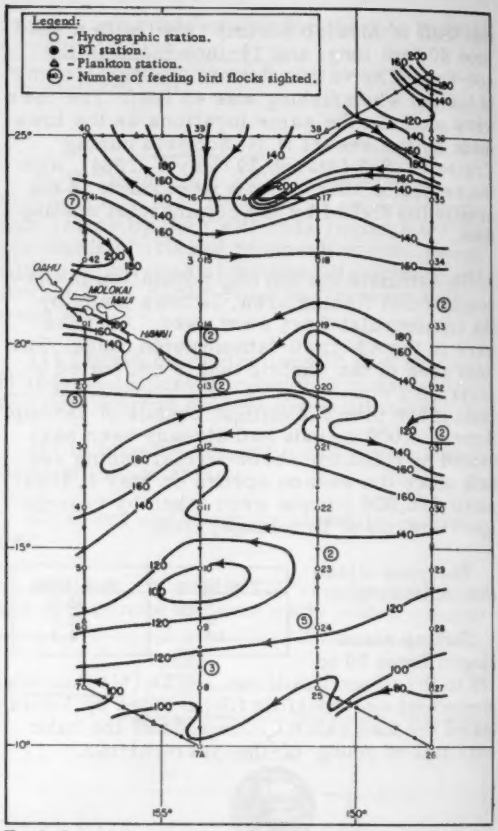
TRADE WIND ZONE OCEANOGRAPHIC STUDIES CONTINUED:

M/V "Townsend Cromwell" Cruise 5 (June 15-July 5, 1964): To determine the rate of change in the distribution of properties in the trade wind zone of the central North Pacific was the objective of this cruise by the U. S. Bureau of Commercial Fisheries research vessel Townsend Cromwell. The cruise was the fifth in a series of oceanographic cruises designed to investigate the relationship between wind and ocean currents.

The area of operations in the central North Pacific was bounded by latitudes 10° N., 27° N., and longitudes 148° W., 158° W. During this cruise, a total of 43 oceanographic stations were occupied along the cruise track (chart). Temperatures and samples for salinity analysis were obtained at 20 depths to 1,500 meters at each station.

Bathythermograms (BT's) were obtained at 30-mile intervals along the cruise track. Between stations 19 and 21, 26 and 28, 35 and 37, BT casts were made at 10-mile intervals.

At 24°00' N., 147°54' W., between stations 35 and 36, subsurface current measurements with a current meter were attempted while



Track chart of the research vessel Townsend Cromwell Cruise 5 (June 15-July 5, 1964), showing depth contours of the 20° C. isotherm in meters.

drifting relative to a parachute drogue set at 1,200 meters. But after only one lowering, the meter became inoperative and the station was abandoned.

During the cruise, a total of 10 plastic-enclosed drift cards were released at 30-mile intervals along the entire cruise track and at 1-hour intervals during the first and last 12 hours of the cruise. Radiation from sun and sky was measured and recorded daily with a pyrheliometer. Colored photographs of cloud formations were made daily.

A standard watch for bird flocks and fish schools was maintained by vessel personnel during daylight hours. In addition, observers aboard the vessel from the Smithsonian Institution maintained their own watch for birds.

In addition to the cruise track, the chart shows the current pattern within the survey region as inferred from the uncorrected field plots of the distribution of the depth of the 20° C. isotherm. The flow pattern is similar to that obtained from the Townsend Cromwell's cruise 4 (May 14-June 5, 1964); however, between stations 12 and 13 the counterclockwise eddy noted during cruise 4 was replaced by a large clockwise eddy. To the east of this feature counterclockwise flow exists, suggesting that those eddies are moving through the region, which would explain the reversal of flow between stations 12 and 13.

A total of 26 unidentified fish schools and 5 skipjack tuna schools were sighted during the cruise. No apparent relation was found between the occurrence of fish schools and the features of the circulation pattern shown on the track chart.

Note: See Commercial Fisheries Review, September 1964 p. 15; August 1964 p. 17.

Clams

SANITATION QUALITY STUDY IN THE MIDDLE ATLANTIC AREA:

A joint study by New York, New Jersey, and the U. S. Public Health Service to investigate the effect of harvesting, processing, and marketing upon the bacteriological quality of the surf clam was started on July 13, 1964. At that time, personnel from the U. S. Public Health Service Northeast Shellfish Sanitation Research Center, Narragansett, R.I., boarded a clam dredging vessel at Point Pleasant, N. J., for a week to observe harvesting practices and to establish a working routine for standardized field procedures.

Federal Purchases of Fishery Products

DEPARTMENT OF DEFENSE PURCHASES:

January-July 1964: FRESH AND FROZEN: For the use of the Armed Forces under the Department of Defense, less fresh and frozen fishery products were purchased by the Defense Subsistence Supply Centers in July 1964 than in the previous month. The decline was 19.7 percent in quantity and 19.9 percent in value. Compared with the same month in the previous year, purchases in July 1964 were up 9.0 percent in quantity and 17.6 percent in value.

Table 1 - Fresh and Frozen Fishery Products Purchased by Defense Subsistence Supply Centers, July 1964 with Comparisons

QUANTITY				VALUE			
July		Jan.-July		July		Jan.-July	
1964	1963	1964	1963	1964	1963	1964	1963
(1,000 Lbs.)				($1,000)			
2,128	1,953	15,514	13,831	1,170	995	8,213	7,768

Table 2 - Purchases of Principal Fresh and Frozen Fishery Products by Defense Subsistence Supply Centers, July 1964 with Comparisons

Product	July				January-July	
	1964		1963		1964	1963
	Quantity	Cost	Quantity	Cost	Quantity	Quantity
	Pounds	Cents/Pound	Pounds	Cents/Pound	Pounds	Pounds
Shrimp:						
raw headless	88,900	84.1	1/	1/	798,450	1/
peeled and deveined	103,568	107.2	1/	1/	608,714	1/
breaded	300,200	68.7	1/	1/	2/2,518,900	1/
molded and breaded	47,500	57.1	1/	1/	274,770	1/
Total shrimp	540,168	77.6	540,629	79.4	4,200,834	3,684,492
Scallops	249,660	57.4	293,486	47.8	1,990,860	1,650,365
Oysters:						
Eastern	45,844	97.1	1/	1/	511,630	1/
Pacific	15,200	58.9	1/	1/	172,472	1/
Total oysters	61,044	87.6	118,429	89.0	684,102	661,989
Clams	10,236	30.0	31,790	30.1	181,809	161,682
Fillets:						
Cod	40,200	26.5	45,718	29.1	281,666	421,321
Flounder and sole	232,600	28.8	208,730	29.3	2,037,766	1,985,134
Haddock	240,500	29.2	170,006	32.1	1,265,104	1,388,433
Ocean perch	176,800	25.0	392,098	28.7	2,123,920	2,303,532
Steaks:						
Halibut	128,300	40.2	86,348	39.5	760,072	812,177
Salmon	16,300	68.8	13,993	58.6	125,225	114,181
Swordfish	500	46.4	2,700	53.7	8,430	19,730

1/Breakdown not available.
2/Revised.

Total purchases in the first 7 months of 1964 were up 12.2 percent in quantity and 5.7 percent in value from those in the same period of 1963. In January-July 1964, there were larger purchases of shrimp and scallops, but noticeably lower purchases of cod fillets, haddock fillets, ocean perch fillets, halibut steaks, and swordfish steaks.

Table 3 - Canned Fishery Products Purchased by Defense Subsistence Supply Centers, July 1964 with Comparisons

Product	QUANTITY				VALUE			
	July		Jan.-July		July		Jan.-July	
	1964	1963	1964	1963	1964	1963	1964	1963
	(1,000 Lbs.)				($1,000)			
Tuna	1/	174	2,617	2,064	2/	81	1,201	1,007
Salmon	-	2	679	18	-	2	416	12
Sardine	21	24	175	321	10	9	111	131

1/Less than 500 pounds.
2/Less than $500.

CANNED: In the first 7 months of 1964, total purchases of the 3 principal canned fishery products (tuna, salmon, and sardines) were up 46.3 percent in quantity and 50.3 percent in value from those in the same period of 1963. The increase was due to larger purchases of tuna and salmon. The gain was partly offset by smaller purchases of canned sardines.

January-June 1964: FRESH AND FROZEN: For the use of the Armed Forces under the Department of Defense, more fresh and frozen fishery products were purchased by the Defense Subsistence Supply Centers in June 1964 than in the previous month. The increase was 19.9 percent in quantity and 30.2 percent in value. Compared with the same month in the previous year, purchases in June 1964 were up 31.0 percent in quantity and 35.6 percent in value due mainly to larger purchases of shrimp, oysters, flounder and sole fillets, and ocean perch fillets. Average prices were somewhat lower for most of the items purchased in larger quantity in June 1964. On the other land, a decline in scallop purchases corresponded with an increase in average scallop prices this June.

Table 4 - Fresh and Frozen Fishery Products Purchased by Defense Subsistence Supply Centers, June 1964 with Comparisons

QUANTITY				VALUE			
June		Jan.-June		June		Jan.-June	
1964	1963	1964	1963	1964	1963	1964	1963
(1,000 Lbs.)				($1,000)			
2,651	2,024	13,386	11,878	1,462	1,078	7,043	6,773

Total purchases in the first 6 months of 1964 were up 12.7 percent in quantity and 4.0 percent in value from those in the same period of 1963. In January-June 1964, there were larger purchases of shrimp, scallops, oysters, and clams, but noticeably lower purchases of cod fillets, haddock fillets, halibut steaks, and swordfish steaks.

CANNED: Tuna was the most important item among the canned purchases in June 1964.

Table 6 - Canned Fishery Products Purchased by Defense Subsistence Supply Centers, June 1964 with Comparisons

Product	QUANTITY				VALUE			
	June		Jan.-June		June		Jan.-June	
	1964	1963	1964	1963	1964	1963	1964	1963
	(1,000 Lbs.)				($1,000)			
Tuna	775	427	2,617	1,890	386	203	1,201	926
Salmon	1/	2	679	16	2/	1	416	10
Sardine	27	55	154	297	11	21	101	122

1/Less than 500 pounds.
2/Less than $500.

Table 5 - Purchases of Principal Fresh and Frozen Fishery Products by Defense Subsistence Supply Centers, June 1964 with Comparisons

Product	June				January-June	
	1964		1963		1964	1963
	Quantity	Cost	Quantity	Cost	Quantity	Quantity
	Pounds	Cents/Pound	Pounds	Cents/Pound	Pounds	Pounds
Shrimp:						
raw headless	185,200	91.5	1/	1/	709,550	1/
peeled and deveined	127,676	113.5	1/	1/	505,146	1/
breaded	592,420	70.3	1/	1/	2,445,970	1/
Total shrimp	905,296	80.7	633,894	85.0	3,660,666	3,143,863
Scallops	347,100	58.4	411,060	43.8	1,741,200	1,356,879
Oysters:						
Eastern	63,296	94.8	1/	1/	465,786	1/
Pacific	52,108	58.3	1/	1/	157,272	1/
Total oysters	115,404	78.3	44,861	99.5	623,058	543,560
Clams	30,040	31.8	10,308	30.7	171,573	129,892
Fillets:						
Cod	44,850	26.0	75,662	27.7	241,466	375,603
Flounder and sole	294,350	29.4	242,580	32.8	1,805,166	1,776,404
Haddock	161,790	29.2	171,853	31.1	1,024,604	1,218,427
Ocean perch	424,100	24.9	249,462	29.8	1,947,120	1,911,434
Steaks:						
Halibut	103,050	38.8	113,349	39.6	631,772	725,829
Salmon	18,296	72.4	10,693	63.8	108,925	100,188
Swordfish	1,110	49.0	3,158	2/	7,930	17,030

1/Breakdown not available.
2/Not available.

FREEZE-DRIED: Fishery purchases for the Armed Forces in June 1964 included 849 pounds of freeze-dried shrimp with an average value of $10.40 a pound.

Notes: (1) Armed Forces installations generally make some local purchases not included in the data given; actual total purchases are higher than indicated because data on local purchases are not obtainable.

(2) See Commercial Fisheries Review, Aug. 1964 p. 20.

Great Lakes

AID UNDER NEW FISHERIES LAW GIVEN GREAT LAKES AREA:

To assist the Great Lakes area fishing industry recover from economic losses suffered in 1963, the Secretary of the Interior has taken action under provisions of a new law.

Section 4(b) of Public Law 88-309 (Commercial Fisheries Research and Development Act) signed by the President on May 20, 1964, provides that the Secretary may make available up to $400,000 to aid a fishing industry when he determined that a commercial fishery failure due to a resource disaster has occurred.

The Secretary has determined that the Great Lakes fishing industry, as well as processors and distributors of smoked fish from the Great Lakes area, incurred substantial economic injury in October 1963 as a result of a temporary loss of market for smoked fish. About 2 million pounds of frozen fish on hand at the time of the incident were still in storage. Because of the length of storage, the fish, even though frozen, deteriorated to a point where they could not be used for human food, or, for the most part, even for pet food. Those stocks were to be removed from normal trade channels and could be used only for fish meal or destroyed. The applicable section of the new law provides that funds available in fiscal year 1965 be used to alleviate the serious situation in the Great Lakes area.

In subsequent years, such funds will be available to other segments of the industry suffering fishery failures arising from resource disasters.

Note: See pp. 85-86 of this issue.

* * * * *

COMMERCIAL FISHERY LANDINGS, 1963:

United States Great Lakes commercial fishery landings in 1963 totaled 55.8 million pounds (valued at $5.1 million ex-vessel), a decline of 9.7 percent in quantity (the value was down about $234,000) from 1962. The 1963 landings were lower in all of the lakes except Lake Ontario (fished mostly by Canada).

Fig. 1 - The Great Lakes showing connecting channels.

Lake Michigan was the largest producer for United States fishermen in 1963 with 21 million pounds or nearly 38 percent of the total United States Great Lakes landings, but the catch from that lake was down 10.5 percent from the previous year. Chub was the leading species for a total of 7.5 million pounds--down about 3.7 million pounds from 1962 as a result of adverse economic conditions in the smoked fish industry during the latter part of the year when fishing for chubs virtually ceased. (The Great Lakes chub is used exclusively by the smoked fish industry.)

Lake Erie landings in 1963 amounted to 17.2 million pounds, down 12.3 percent from the previous year principally because of a decline in catches of yellow perch and carp. The 1963 landings of 12.1 million pounds from Lake Superior were down 4 percent from 1962

Fig. 2 - Great Lakes fishing village with fishing vessels at anchor.

and those from Lake Huron of 5.2 million pounds declined 11 percent from the previous year.

Canada's 1963 Great Lakes commercial fishery landings of 44.8 million pounds (preliminary data) were 17.9 percent lower than the previous year, but the ex-vessel value of $4.2 million was about 3 percent higher than in 1962. Lake Erie accounted for about 80 percent of the total Canadian Great Lakes commercial fish landings in 1963, but the Canadian fish catch from that lake was about 9 million pounds below 1962. The smelt catch was down sharply in 1963 (from 19.1 million pounds in 1963 to 10.6 million pounds in 1962) and the Canadian yellow perch catch of 18 million pounds was 2.9 million pounds less than 1962.

Gulf Fishery Investigations

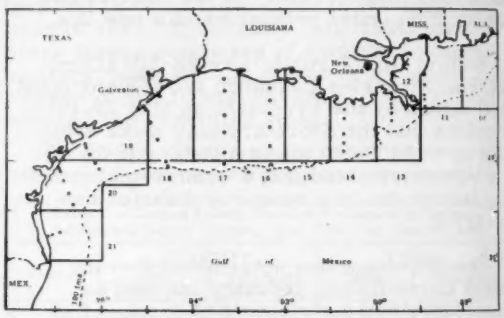
SHRIMP DISTRIBUTION STUDIES:

M/V "Gus III" Cruise GUS-19 (July 9-19, 1964): Shrimp sampling in the northwest Gulf of Mexico was continued during this cruise by the chartered research vessel Gus III, operated by the U. S. Bureau of Commercial Fisheries Biological Laboratory, Galveston, Tex. Shrimp sampling was conducted in 8 statistical areas from off the coast of Louisiana to Texas with standard 3-hour tows using a 45-foot shrimp trawl.

Trawler Gus III (85 feet) is chartered by the U. S. Bureau of Commercial Fisheries and used by the Bureau's Galveston (Tex.) Biological Laboratory scientists for shrimp studies in the northern Gulf of Mexico.

During this cruise, the scientists made a total of 35 tows with the flat trawl, 50 plankton tows, and 44 bathythermograph and 41 nansen bottle casts.

Areas 18, 19, and 20 yielded the largest catches of brown shrimp (31-40 count) from the 10- to 20-fathom depth range. The most productive tow was from area 18 with a total of 91 pounds of that size brown shrimp. Those areas combined also yielded 23 pounds of large white shrimp (ranging from 12-20 count) from the under 10-fathom depth, and a smaller quantity of medium size (12-40 count) pink shrimp.



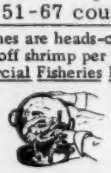
Shows station pattern of Gus III during Cruise GUS-19, July 9-19, 1964.

Large brown shrimp (20 pounds of 15-20 count) were caught in the over 20-fathom depth of area 13. Other depths in that area yielded only fair amounts of smaller brown shrimp and a few pounds of large white shrimp from the under 10-fathom depth.

A total of 67 pounds of shrimp was taken from area 16 with large (12 to 20 count) brown and white shrimp predominating. These were from depth ranges of up to 10 fathoms and over 20 fathoms. The 10- to 20-fathom depth in that area yielded less than one pound of shrimp.

The smallest yield during the cruise was from area 14--about 11 pounds of brown shrimp, mostly 51-67 count.

Note: (1) Shrimp catches are heads-on weight; shrimp sizes are the number of heads-off shrimp per pound.
(2) See Commercial Fisheries Review, Sept. 1964 p. 23.



Industrial Fishery Products

U.S. FISH MEAL, OIL, AND SOLUBLES: Production by Areas, July 1964: Preliminary data on U.S. production of fish meal, oil, and solubles for July 1964 as collected by the U.S. Bureau of Commercial Fisheries and submitted to the International Association of Fish Meal Manufacturers are shown in the table.

U.S. Production[1] of Fish Meal, Oil, and Solubles by Areas, July 1964 (Preliminary) with Comparisons

Area	Meal	Oil	Solubles	Homogenized[3]
	Short Tons	1,000 Pounds	....(Short Tons)....	
July 1964:				
East & Gulf Coasts	37,771	28,321	16,332	-
West Coast[2]	3,302	3,522	1,306	-
Total	41,073	31,843	17,638	-
Jan.-July 1964 Total	125,039	106,740	52,003	-
Jan.-July 1963 Total	128,293	99,688	50,133	6,372

1/Does not include crab meal, shrimp meal, and liver oils.
2/Includes American Samoa and Puerto Rico.
3/Includes condensed fish.

* * * * *

Production, June 1964: During June 1964, a total of 43,604 tons of fish meal and scrap and 40.2 million pounds of marine animal oils was produced in the United States. Compared with June 1963 this was an increase of 8,741 tons in meal, and over 12.0 million pounds in oil production. Fish solubles production amounted to 16,791 tons--an increase of 2,702 tons compared with June 1963.

Menhaden meal production for June 1964 amounted to 37,035 tons--an increase of 7,853 tons compared with June 1963, and menhaden oil totaled 37.2 million pounds--an increase of 10.5 million pounds over June 1963. Tuna and mackerel meal production amounted to 1,870 tons--an increase of 931 tons compared with June 1963. Oil produced from tuna and mackerel amounted to 424,000 pounds--an increase of 155,000 pounds compared with June 1963. Herring meal production (1,256 tons) showed an increase of 957 tons, and herring oil production amounted to about 2.0 million pounds.

U.S. Production of Fish Meal, Oil, and Solubles, June 1964[1] with Comparisons

Product	June 1/1964	June 1963	Jan.-June 1/1964	Jan.-June 1963	Total 1963
	(Short Tons)				
Fish Meal and Scrap:					
Herring	1,256	299	1,684	299	7,537
Menhaden 2/	37,035	29,182	63,021	68,597	181,750
Tuna and mackerel	1,870	939	8,466	10,369	26,957
Unclassified	3,443	4,443	10,795	11,787	22,415
Total	43,604	34,863	83,966	91,052	238,659
Shellfish, marine-animal meal and scrap	3/	3/	3/	3/	14,793
Grand total meal and scrap	3/	3/	3/	3/	253,452
Fish Solubles:					
Menhaden	14,475	12,259	25,120	26,977	74,831
Other	2,316	1,830	9,245	12,007	25,347
Total	16,791	14,089	34,365	38,984	100,178
Homogenized condensed fish	-	1,341	-	3,841	7,224
	(1,000 Pounds)				
Oil, body:					
Herring	1,962	448	2,148	494	5,709
Menhaden 2/	37,243	26,701	68,732	64,901	167,635
Tuna and mackerel	424	269	1,758	1,652	5,735
Other (including whale)	601	775	2,259	2,542	6,748
Total oil	40,230	28,193	74,897	69,589	185,827

1/Preliminary data.
2/Includes a small quantity of thread herring.
3/Not available on a monthly basis.

Menhaden meal production for May 1964 amounted to 22,664 tons--a decrease of 11,760 tons as compared with May 1963. The menhaden oil production amounted to 28.5 million pounds--a decrease of 4.0 million pounds. Tuna and mackerel meal production amounted to 1,389 tons for May 1964--a decrease of 874 tons, while oil (222,000 pounds) produced from tuna and mackerel showed a slight increase of 9,000 pounds over May 1963.

A total of 59,543 tons of fish meal was imported during May 1964--an increase of 29,144 tons as compared with May 1963. Imports of fish meal for the first 5 months in 1964 amounted to 221,914 tons--an increase of 58,432 tons as compared with the same period in 1963. Imports from Peru for January through May 1964 amounted to 181,196 tons--an increase of 55,198 tons as compared with the same period in 1963.

* * * * *

Production, May 1964: During May 1964, a total of 27,304 tons of fish meal and scrap and 29.4 million pounds of marine-animal oils was produced in the United States. Compared with May 1963, this was a decrease of 12,598 tons in meal, and a decrease of 4.1 million pounds in oil. Fish solubles amounted to 11,736 tons--a decrease of 4,011 tons.

U.S. Production of Fish Meal, Oil, and Solubles, May 1964[1] with Comparisons

Product	May 1/1964	May 1963	Jan.-May 1/1964	Jan.-May 1963	Total 1963
	(Short Tons)				
Fish Meal and Scrap:					
Herring	-	-	2/	-	7,537
Menhaden 3/	22,664	34,424	25,986	39,415	181,750
Sardine, Pacific	-	-	1	-	-
Tuna and mackerel	1,389	2,263	6,596	9,430	26,957
Unclassified	3,251	3,215	7,779	7,344	22,415
Total	27,304	39,902	40,362	56,189	238,659
Shellfish, marine-animal meal and scrap	4/	4/	4/	4/	14,793
Grand total meal and scrap	4/	4/	4/	4/	253,452
Fish solubles:					
Menhaden	9,320	12,882	10,645	14,718	74,831
Other	2,416	2,865	6,929	10,177	25,347
Total	11,736	15,747	17,574	24,895	100,178
Homogenized condensed fish	-	1,250	-	2,500	7,224
	(1,000 Pounds)				
Oil, body:					
Herring	-	-	-	-	5,709
Menhaden 3/	28,482	32,500	31,489	38,200	167,635
Tuna and mackerel	222	213	1,334	1,383	5,735
Other (including whale)	722	831	1,845	1,813	6,748
Total oil	29,426	33,544	34,668	41,396	185,827

1/Preliminary data.
2/Included in "other" or "unclassified."
3/Includes a small quantity of thread herring.
4/Not available.

* * * * *

Major Indicators for U. S. Supply, June 1964: United States production of fish meal in 1964 was higher by 25.1 percent as compared with June 1963. Production of fish oil was up by 42.7 percent and that of fish solubles increased 8.8 percent.

Major Indicators for U.S. Supply of Fish Meal, Solubles, and Oil, June 1964

Item and Period	1/1964	1963	1962	1961	1960
	(Short Tons)				
Fish Meal:					
Production:					
June	43,604	34,863	61,171	54,399	44,311
January-May 2/	40,362	56,189	60,665	48,103	35,920
Year 3/	-	253,452	312,259	311,265	290,137
Imports:					
June	34,515	18,452	26,453	19,317	11,178
January-May	221,914	163,482	114,433	88,509	55,197
Year	-	383,107	252,307	217,845	131,561
Fish Solubles 4/:					
Production:					
June	16,791	15,430	24,745	17,772	20,735
January-May 2/	17,574	27,395	26,762	22,428	16,211
Year	-	107,402	124,334	112,241	98,929
Imports:					
June	249	323	872	207	149
January-May	1,802	2,116	3,418	1,012	2,369
Year	-	6,773	6,308	6,739	3,174
	(1,000 Lbs.)				
Fish Oils:					
Production:					
June	40,230	28,193	54,924	49,686	35,907
January-May 2/	74,897	41,396	40,698	39,340	20,433
Year	-	185,827	250,075	258,118	209,143
Exports:					
June	117	255	4,921	21,035	15,629
January-May	56,139	87,806	58,084	47,092	37,191
Year	-	262,342	123,050	122,486	143,659

1/Preliminary.
2/Data for 1964 based on reports which accounted for the following percentage of production in 1963: Fish meal, 95 percent; solubles and homogenized fish, 99 percent; and fish oils, 99 percent.
3/Small amounts (10,000 to 25,000 pounds) of shellfish and marine animal meal and scrap not reported monthly are included in annual totals.
4/Includes homogenized fish.

* * * * *

U. S. FISH MEAL AND SOLUBLES:

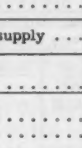
Production and Imports, January-June 1964: Based on domestic production and imports, the United States available supply of fish meal for January-June 1964 amounted to 340,395 short tons--67,409 tons (or 24.7 percent) more than during January-June 1963. Domestic production was 7,086 tons (or 7.8 percent) less, but imports were 74,495 tons (or 40.9 percent) higher than in January-June 1963. Peru continued to lead other countries with shipments of 205,135 tons.

The United States supply of fish solubles (including homogenized fish) during January-June 1964 amounted to 36,416 tons--a decrease of 19.5 percent as compared with the same period in 1963. Domestic production and imports dropped 19.8 percent and 15.9 percent, respectively.

U. S. Supply of Fish Meal and Solubles, January-June 1964 with Comparisons

Item	Jan.-June 1/1964	Jan.-June 1963	Total 1963
	(Short Tons)		
Fish Meal and Scrap:			
Domestic production:			
Menhaden	63,021	68,597	181,750
Tuna and mackerel	8,466	10,369	26,957
Herring	1,684	299	7,537
Other	10,795	11,787	37,208
Total production	83,966	91,052	253,452
Imports:			
Canada	30,015	23,328	50,925
Peru	205,135	136,051	291,544
Chile	10,036	16,798	24,249
Norway	-	331	1,819
So. Africa Republic	9,538	4,466	12,296
Other countries	1,705	960	2,274
Total imports	256,429	181,934	383,107
Available fish meal supply	340,395	272,986	636,559
Fish Solubles:			
Domestic production	34,365	2/42,825	2/107,402
Imports:			
Canada	1,031	1,341	2,034
Iceland	-	105	160
So. Africa Republic	780	81	411
Other countries	240	912	4,168
Total imports	2,051	2,439	6,773
Available fish solubles supply	36,416	45,264	114,175

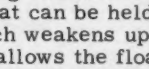
1/Preliminary.
2/50-percent solids. Includes production of homogenized condensed fish.



Inventions

FLOAT FOR FISHING LINE PATENTED:

The inventor of a float for fishing states that the device stays in the direction of the angler, loose on the line, allowing ease in casting and pulling. The float, which is equipped with a clamp, is loosely connected with the fishing line when the angler makes a cast. The float can be held in position by an adhesive which weakens upon contact with water. This allows the float to grip the line in an advantageous position on the surface of the water while the bait is always at the bottom, according to the inventor. (Patent No. 3,087,275, SIC No. 3949, granted Ernst Svoboda, Meiselstr. 65, Vienna 14, Austria.)



Lobsters

NEW TAGGING METHOD AIDS POPULATION STUDIES:

Success in permanently marking lobsters with internal tags has been reported by a University of Rhode Island oceanographer in the first phase of a study to learn more of the life and habits of the northern lobster.

The first known successful molt of an internally-tagged North Atlantic lobster took place July 15, 1964, in the lobster pound of a Rhode Island shellfish company when a lobster crawled out of its external skeleton still retaining a numbered,

(Table continued on next column.)

plastic-coated slug in its body. That development removes one of the major technical barriers to a study that could play a significant role in shaping lobster fishing legislation in the various States.

In recent years a disagreement has arisen involving the offshore lobstermen who fish with otter trawls on the continental shelf and the inshore lobstermen who use baited traps or pots in shallower waters. In dispute is whether the inshore and offshore lobsters are separate populations that should be controlled by different rules and standards or whether the offshore group is the major breeding stock for the entire population.

In planning studies to answer those and other questions, the new internal-tagging method for lobsters may represent a major breakthrough. Half-inch tags, weighing 0.16 grams or about 15 times less than a dime, are inserted behind the eye socket of lobsters, using a needle-sharp, stainless-steel, hollow plunger. Insertion takes only a matter of seconds and does not impair or affect a lobster's sight or other body functions. The cavity where the tag lodges has no "meat" and is not eaten by humans.

Since the tag contains a small amount of iron, it can be spotted by a very sensitive and sophisticated metal detector. For that purpose an electrical engineer has developed two opposing copper coils encased in a single plastic case which create a magnetic flux when energized. Shaped in the form of a hollow pipe about a foot long and a foot in diameter, the coils are hooked into an amplifier. The passage of a tagged lobster through the pipe creates a pulse which can be used to close a relay and activate a light, buzzer, or other warning signal.

With an investment of about $5,000, it is thought that 10 additional and more compact detectors could be built and placed aboard commercial lobster vessels. Since lobsters have to be culled and handled individually to detect the presence of egg-bearing females, researchers believe it may be feasible to ask that commercial catches be funneled through a detector and that marked lobsters be put aside for further study.

In the past, scientists attempting to tag lobsters have used various external devices which are lost when the crustacean molts--about every year for adult males and every two years for adult females. The younger lobsters shed their skeletons even more frequently.

By tagging lobsters and returning them to their natural habitat to be caught by commercial fishermen, scientists hope to learn more about rates of growth, molting frequency, natural mortality rates, migratory patterns, and rates of harvesting--all on a long-term basis. In addition, the offshore catch is subject to seasonal variations. Do lobsters merely disperse over wide areas or do they travel to some other particular location? Such knowledge could be used to increase catches and the new internal-tagging technique may help provide answers. The developer of the new tagging method has cautioned, however, that more research is needed on the long-term effects of the tags on lobsters. (University of Rhode Island, August 23, 1964.)

Maine Sardines

CANNED STOCKS, JULY 1, 1964:

Canners' stocks of Maine sardines on July 1, 1964, were 129,000 cases less than those on hand July 1, 1963, but were 140,000 cases above stocks on hand two years earlier on July 1, 1962 (the pack for the 1961 season was exceptionally small).

Carryover stocks at the canners' level amounted to about 622,000 cases on April 15, 1964, which is the traditional opening date of the Maine sardine packing season. Carryover stocks amounted to 660,000 cases on April 15, 1963, but only 33,000 cases on April 15, 1962, following the short-pack year.

Table 1 - Canned Maine Sardines--Wholesale Distributors' and Canners' Stocks, July 1, 1964, with Comparisons

Type	Unit	7/1/64	7/1/63	7/1/62
Distributors	actual cases	234,000	217,000	134,000
Canners	std. cases 1/	514,000	643,000	374,000

1/100 3¼-oz. equal one standard case.

Source: U. S. Bureau of the Census, Estimates of Distributors' and Canners' Stocks -- July 1, 1964.

During April 15-July 25, 1964, the Maine sardine pack totaled 315,750 standard cases, according to the Maine Sardine Council. That was much less than the 728,988 cases packed during the same period of 1963, but considerably larger than the 179,000 cases packed in the same period in 1961 when fishing was extremely poor.

In late July 1964, fishing conditions for Maine sardines were favorable and the pack was expected to improve during August.

Marketing

EDIBLE FISHERY PRODUCTS, JANUARY-JUNE 1964:

Supplies of edible fishery products during the first 6 months of 1964 were larger than in the same period a year earlier. United States holdings of fishery products in cold-storage at the beginning of the year, together with increased fishery products imports, more than offset the lower fishery landings of the first 6 months in 1964. With retail prices somewhat lower than in the corresponding period a year earlier, the domestic consumption of fishery products rose slightly.

At midyear, stocks of edible frozen fishery products were about 5 percent lower than for

Retailers waiting for their purchases in loading area in the salt-water section of New York City's Fulton Fish Market.

the same period a year earlier. Cold-storage holdings of fish sticks and portions, halibut and cod fillets, and steaks were down considerably. But stocks of haddock fillets, crabs (including crab meat), and raw headless shrimp were larger than on June 30, 1963.

United States consumption of fishery products will likely continue above a year earlier throughout the summer and fall months. Although present conditions point to lower domestic fishery landings of some major species--scallops, halibut, and ocean perch, in particular--increasing imports are likely to more than compensate for the decline. Marked increases over 1963 are anticipated in the 1964 United States imports of tuna, scallops, ocean perch, and cod fillets.

Retail prices for the balance of 1964, it is believed, will continue at least as favorable for consumers as last year. The retail food price index for fishery products is expected to average slightly below a year earlier during the latter half of this year. Some slight seasonal increase in prices may be expected toward the end of the year.

Note: This analysis was prepared by the Bureau of Commercial Fisheries, U. S. Department of the Interior, and published in U. S. Department of Agriculture's August 1964 issue of the National Food Situation (NFS-109).

North Atlantic Fisheries Investigations

BLACKBACK FLOUNDER STUDIES AIDED BY DISCOVERY OF DISTINCTIVE GROUP ON GEORGES BANK:

Blackback flounder do not usually migrate great distances as many tagging experiments have shown. How little they move about even on offshore fishing banks was recently indicated when one small area on Georges Bank was discovered to harbor a substantial percentage of abnormally pigmented blackbacks. When it turned out that almost all were exactly the same age, 5 years, it was even more apparent that the fish tend to stay in one place. Current opinion is that color abnormalities are the result of external factors and are not genetic. Oceanographic data for 1959 are being carefully examined for clues that may help explain the unusual markings. The location of the isolated and distinctive group of fish is considered a timely discovery by the U. S. Bureau of Commercial Fisheries Woods Hole (Mass.) Biological Laboratory which is attempting to determine the origin of blackbacks on Georges Bank.

Note: See Commercial Fisheries Review, August 1964 p. 34.

North Pacific Exploratory Fishery Program

HAKE DISTRIBUTION STUDY:

M/V "John N. Cobb" Cruise 67 (August 10-October 9, 1964): To study hake resources off the Washington, Oregon, and northern California coasts in depths from 35 to 100 fathoms was the purpose of this cruise by the U. S. Bureau of Commercial Fisheries research vessel John N. Cobb which left Seattle, August 10, 1964, for 8 weeks of exploratory fishing.

John N. Cobb, U. S. Bureau of Commercial Fisheries exploratory fishing vessel, this past summer was studying the hake resources off Washington, Oregon, and northern California.

The main objective of the cruise was to investigate the bathymetric and geographic distributions of the hake populations from Cape Flattery, Wash., to northern California. Secondary objectives were to attempt to assess the magnitude of the hake resources in those waters, and to collect pertinent data on the environmental factors influencing the distribution and abundance patterns.

The method of operation included echo-sounding transects to locate concentrations of hake, and the use of various trawls to sample the density of the hake population when located.

* * * * *

PELAGIC TRAWL DEVELOPMENT PROGRAM:

M/V "St. Michael" Cruise 3: To evaluate and modify a newly-designed multipurpose pelagic trawl having very long wings in a configuration similar to a lampara seine was the purpose of this cruise by the U. S. Bureau of Commercial Fisheries chartered gear research vessel St. Michael.

The vessel left Seattle, Wash., on August 17, 1964, for 4 weeks of operations in bay and coastal waters. The cruise plan called for underwater and surface observations and measurements of the new trawl which is to be developed for off-bottom, midwater, and surface fishing. Actual fishing trials of the net will be conducted during subsequent cruises.

Oceanography

GULF OF GUINEA INVESTIGATIONS BY RESEARCH VESSEL "GERONIMO":

M/V "Geronimo" Cruise 4 (July 10-November 4, 1964): To continue oceanographic studies in the Gulf of Guinea is the purpose of this 118-day cruise by the research vessel Geronimo, operated by the U. S. Bureau of Commercial Fisheries Biological Laboratory, Washington, D. C. The studies to be undertaken on this cruise will be along the same lines as those conducted during Geronimo cruise 3 (January 15-May 15, 1964), when she participated in EQUALANT III of the International Cooperative Investigations of the Tropical Atlantic (ICITA).

Cruise 4 started on July 10, 1964, when the vessel departed Norfolk, Va., with Dakar, Senegal, scheduled as the first port of call on July 27. The vessel's operational schedule lists Abidjan, Ivory Coast, as the last port of call on October 14, and return thereafter to the United States with arrival at Washington, D. C., on November 4, 1964.

The objectives of this cruise are:

1. Extension of the current measurement program in conjunction with biological and environmental studies in the Gulf of Guinea.

2. Surveys of the distribution of schools of tuna in surface waters of the Gulf of Guinea and of related environmental parameters.

3. Field training for staff technicians and personnel detached from other activities.

4. Evaluation of new analytical instruments and various anti-ocidants as stabilizers of biological color in preserved plankton studies.

Schedule of Observations:

1. Norfolk, Va., to Dakar (July 10-27):

a. Equipment shakedown station will be occupied in 1,000 fathoms of water east of Cape Henry. Work will include bathythermograph (BT) cast, 18 bottle hydrographic cast to 1,000 meters, current meter observation, Neuston net haul, Clarke Bumpus haul.

b. A BT cast and surface salinity sample every 3 hours. An ASWEPS BT message will be transmitted every 6 hours.

c. Weather observations every 6 hours, at 0000, 0600, 1200, 1800 GMT. All messages will be transmitted as synoptically as practicable.

d. While under way and during daylight hours, a record will be maintained of the occurrence of fish schools, birds, and mammals observed at the sea surface.

e. A productivity station will be made at local noon daily. Measurements will be made at depths of 100, 50, 25, 10, 1 percent of incident solar radiation. Phosphate and salinity samples will be analyzed at each depth sampled.

f. A 30-minute surface plankton tow with a one-meter net to be made each midnight.

g. A 15-minute Neuston haul to be made just preceding the productivity station at LAN and each midnight following the meter-net haul.

h. A two-hour nightlight station following the plankton tows each midnight while in the Sargasso Sea.

2. Dakar, Senegal, to Lagos, Nigeria--Tuna Survey I (July 30-August 25):

a. Baiting: Search for suitable bait will begin in the evening off the coast of Senegal. Local sources of bait information will be utilized. After adequate bait supplies have been obtained, a 12-hour "settling down" period will be allowed before proceeding to survey area. If bait is not found the search will be continued off the coast of Sierra Leone. Surface water temperature and salinity observations will be made wherever bait is obtained.

b. Tuna surveys: These surveys will be conducted during daylight hours, about 0600-1800 each day. The search will follow an "in-out" pattern with lines extending south

from the 100-fathom curve for a distance of about 90 miles, the transects beginning at 7°30' west longitude, being spaced at 30-minute intervals and terminating at 3°30' east. If bait is completely unavailable, survey transects will be run using either jigs or long line gear.

Samples of tuna from a maximum number of schools are desired. Pole-and-line fishing will be attempted on each school encountered. Jigs will be trolled continuously during the tuna surveys. If the fish bite, fishing will be broken off after 25 fish of each species in the school are aboard. If the fish do not come up to the vessel and start biting after 2 passes, chumming will be broken off and the survey resumed. It is not known at what point in the survey that the initial supply of live bait may become exhausted. In the event that this does occur, an attempt will be made to replenish the supply of bait, after which the survey will be resumed.

Observations to be made upon successful sampling of tuna schools will include:

(a) Fork length, sex, weight.

(b) Preserve 10 ovaries from among the 25 caught from each school sampled.

(c) Preserve stomach samples from each of the 25 caught from each school.

Supplemental observations during the tuna surveys:

(1) 0500-0600 BT and Nansen bottle cast.

(2) BT's every hour and at each fishing station.

(3) Productivity station, hydrographic cast and meter-net haul at local noon daily.

(4) BT cast, Nansen bottle cast, and meter net haul 1800-1900 daily.

(5) Weather observations every 6 hours.

(6) At midnight a ½-hour meter-net haul at the surface.

(7) After the meter-net haul, two 15-minute hauls with the Neuston net.

(8) A two-hour nightlight station following the net tows.

(9) Bathymetry. The EDO will be operated at all times while under way. A time-reference notation will be made on the fathogram every half hour.

3. Lagos to Freetown, Sierra Leone (August 28-September 17):

a. A total of 30 stations will be occupied:

(1) BT casts before and after Nansen bottle casts.

(2) 18-bottle hydrographic cast to 1,000 meters.

(3) At 13 of the hydrographic stations a current meter will be lowered from the vessel to 500 meters using an anchored buoy as a reference.

(4) A one-half hour meter-net haul at the surface.

(5) A 15-minute Neuston haul.

b. Between stations, BT casts and surface salinity samples every hour.

(1) Weather observations every 6 hours.

(2) A productivity station daily at local apparent noon.

(3) Bathymetry observations throughout.

(4) Nightlighting as opportunity affords.

(5) A transect of 6 depth Clarke Bumpus hauls crossing the equator on a line between 3° N. and 3° S.

(6) A 24-hour Clarke Bumpus station will be occupied at a suitable location in equatorial waters. C-B hauls at 6 depths will alternate with BT casts throughout the period.

c. Additional shallow drogue observations will be carried out as required to properly implement the current meter observations.

4. Freetown to Abidjan (September 20-October 16):

Tuna Survey II will be a repeat of Tuna Survey I.

5. Abidjan to Washington, D. C. (October 16-November 4):

The same observational schedule will be followed as during passage from Washington, D. C., to Dakar.

Note: See Commercial Fisheries Review, July 1964 p. 24; April 1964 p. 46.

* * * * *

NEW OCEANOGRAPHIC RESEARCH VESSELS LAUNCHED BY U. S. NAVY:

The oceanographic research vessel Thomas G. Thompson (AGOR-9) was launched July 18, 1964, at Marinette, Wis., by the U. S. Navy. The vessel is designed to be a floating laboratory to be used in support of the National Oceanographic Research Program. It will be operated by the University of Washington. The new vessel is 209 feet in overall length and displaces 1,370 tons.

* * * * *

The USNS Silas Bent was launched May 16, 1964, as the first of a series of five intermediate-sized oceanographic vessels for the U. S. Navy. The Silas Bent was designed primarily to do surveying work programmed by the United States Naval Oceanographic Office

in both Arctic and tropical waters. The foresection of the vessel is sufficiently ice-strengthened to navigate Arctic waters and the vessel is air-conditioned throughout. The principal dimensions of the vessel are: length overall 285 feet; beam, maximum moulded, 48 feet; depth, moulded to main deck, 23½ feet; and displacement, full load, 2,550 long tons. Accommodations are provided for 12 officers, 32 crewmen, and 34 scientists.

The Silas Bent is powered by a single-screw Diesel-electric propulsion system, providing a sustained service speed of 15 knots, and an endurance of 12,000 miles at 12 knots. The principal machinery consists of two 1,260 kw. Diesel generators coupled to a single shaft through a 3,000-hp. motor. The vessel also has a trainable and retractable bow propulsion unit that is capable of moving or maintaining the vessel's position in any desired direction while it is engaged in oceanographic operations.

Launching of the Silas Bent at Loraine, Ohio.

Other features include a 15,000-pound hydraulic anchor windlass, 12 electric winches for handling scientific equipment, and an articulated crane with a 2,500-pound capacity at a radial outreach of 57 feet.

The Silas Bent has been named in honor of a United States Naval officer who was a pioneer in oceanographic work. As a lieutenant, Silas Bent (1820-1887) was active in survey work and served under Commodore Matthew Perry on expeditions to Japan.

In charge of hydrographic surveying on these expeditions, Lieutenant Bent's most significant achievement was to establish the delineation and description of the Kuro Siwo or Black Tide, the great northward-flowing stream in the Pacific Ocean, comparable to the Gulf Stream in the North Atlantic.

The Silas Bent is scheduled for completion by July 1965. The vessel will be under the operational control of the Military Sea Transportation Service and under the technical control of the Naval Oceanographic Office. (Sea-lift Magazine, August 1964.)

Oregon

SALMON ESCAPEMENT AIDED BY BRIEF INDUSTRIAL PLANT SHUTDOWN AT WILLAMETTE FALLS:

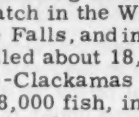
A 3-hour shutdown of operations at 2 industrial plants at Willamette Falls, Oreg., on June 18, 1964, resulted in the escapement of a substantial number of adult spring chinook salmon that had been trapped in a cul-de-sac on the west side of the river. An Oregon Fish Commission biologist reported that 841 chinook successfully negotiated the fish ladder at the Falls following the shutdown on that day as contrasted with only 39 fish passing the previous day. The fishery scientist commended the industries for their cooperation in the conservation effort. He said the companies involved have agreed to the temporary shutdown each season for many years despite the considerable cost to them.

The cul-de-sac is a deep pocket or cove located on the west side of the river just below the falls. It has long been a problem area since water flowing into the pocket from industrial operations at the site creates a current which attracts upstream migrating fish. Many of the fish that are drawn there mill about endlessly, apparently unwilling to leave the attractive current flowing from the industrial plants.

Shutting down the plants for a period of time eliminates the cul-de-sac attraction thus encouraging the fish to move out of the blind alley. Much of the water that normally flows through the plants and into the cul-de-sac is diverted to the fish ladder or over the falls in the immediate vicinity of the ladder during a shutdown. This creates a stronger than usual attraction flow that enables the fish to much more readily locate the entrance to the passage facility.

A tabulation of this season's spring chinook run showed that 36,370 chinook had pass-

ed over the ladder at Willamette Falls by late June 1964. During the same period, the sport chinook catch in the Willamette, from the mouth of the Falls, and in the lower Clackamas River totaled about 18,600 fish. The total Willamette-Clackamas spring chinook run was about 58,000 fish, including 3,000 escapement tabulated on the Clackamas River. The average run for the past 17 years has been 50,000 spring chinook. (Oregon Fish Commission, June 22, 1964.)

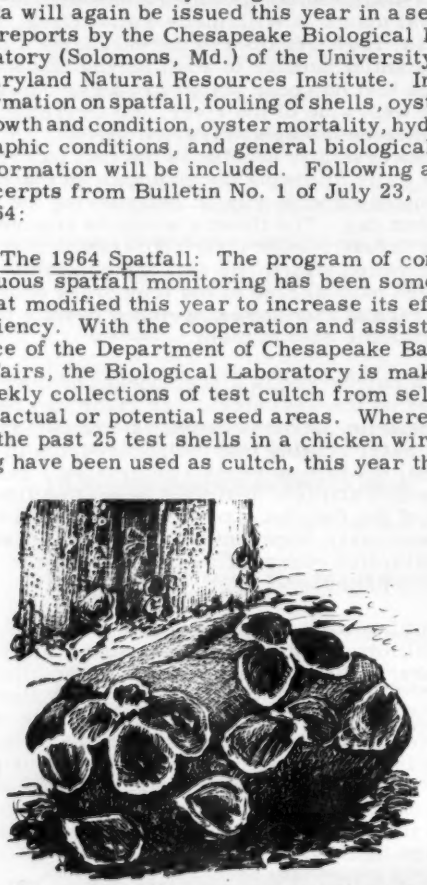


Oysters

MARYLAND OBSERVATIONS FOR 1964:

Information on oyster growth and related data will again be issued this year in a series of reports by the Chesapeake Biological Laboratory (Solomons, Md.) of the University of Maryland Natural Resources Institute. Information on spatfall, fouling of shells, oyster growth and condition, oyster mortality, hydrographic conditions, and general biological information will be included. Following are excerpts from Bulletin No. 1 of July 23, 1964:

The 1964 Spatfall: The program of continuous spatfall monitoring has been somewhat modified this year to increase its efficiency. With the cooperation and assistance of the Department of Chesapeake Bay Affairs, the Biological Laboratory is making weekly collections of test cultch from selected actual or potential seed areas. Whereas in the past 25 test shells in a chicken wire bag have been used as cultch, this year the shells have been replaced by $4\frac{3}{4}$-inch square plates of an asbestos composition board. Two plates of that kind are exposed in specially-designed wooden holders hung just above the bottom at each station. Previous tests have shown that the plates are attractive to the same organisms as oyster shells.



Oyster spat (magnified many times) on small pebble.

Each week the holders are changed and the plates are brought to the Laboratory and examined under a microscope. Spat, as well as barnacles, blisters, and other associated fouling organisms are counted, and tallied in a systematic manner, thus showing when the potential set reaches a peak in any given area. With the use of the plates, it is possible to count spat faster and with more accuracy than before. Investigations have the additional advantage of examining a precisely known area of cultch.

Setting began late this spring, since the water temperature took longer than usual to reach the sustained high level required for spawning. As of late July 1964, the set had not reached the level of last season.

The 1963 Spatfall: The 1963 spatfall was well above average in both intensity and range, and proved to be the best general set in over 15 years. Most of the shell plantings were highly successful and the seed areas produced valuable seed. A few areas, such as Holland Straits, were spotty and irregular. The St. Marys River and the Wicomico tributary of the Potomac River were both high producing areas. Parts of Eastern Bay, Harris Creek, Broad Creek, the Little Choptank River, and Kedges Straits also exhibited high counts, as did the Honga River. In the Potomac River, the Jones Shore-Cornfield area was the site of the highest set. Further up the Bay, even the South River had a good strike, most of which caught on mussel shells.

Notes: (1) For more detailed data write to the Chesapeake Biological Laboratory, Natural Resources Institute, University of Maryland, Solomons, Md. ("Report of Maryland Oyster Observations for 1964," Bulletin No. 1, July 23, 1964.)
(2) See Commercial Fisheries Review, Feb. 1964 p. 33.

Radiation Preservation

PACKAGING REQUIREMENTS FOR IRRADIATED PRODUCTS:

A major consideration in using radiation to preserve fishery products is a selection of suitable packaging materials in which the product can be irradiated and marketed. Such

materials must be nontoxic, must not be affected by irradiation, and must protect the product from oxidation and bacterial contamination. In addition, the materials should be relatively strong so that they will withstand moderate to severe handling, must be easily and effectively sealed and despite rough handling must retain an effective seal, should be inexpensive, and should be lightweight to minimize shipping costs.

In view of those requirements, tests on various types of plastic films are being conducted by the U. S. Bureau of Commercial Fisheries Technological Laboratory at Gloucester, Mass. Eight plastic films have been investigated. The results indicate that 4 of the films--nylon 11, "saran" (coated nylon 11), and 2 different polyolefin films (coated polyesters)--are suitable in that they meet the requirements described above.

Three films--polyethylene, polypropylene, and nylon 6--were found to be poor oxygen barriers. Those films allowed increased bacterial multiplication during storage. That was probably due to oxygen permeability. Cellophane was found to be a good oxygen barrier, but had poor sealing characteristics.

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MASSACHUSETTS FISHERY PRODUCTS IRRADIATOR NEAR COMPLETION:

The Marine Products Development Irradiator being built adjacent to the U. S. Bureau of Commercial Fisheries Technological Laboratory at Gloucester, Mass., is expected to be ready for dedication about the end of September. The facility will be operated as part of the research and development program conducted in cooperation with the Atomic Energy Commission (AEC) by the Bureau's Technological Laboratory at Gloucester. When completed, the plant is expected to operate on a near-commercial scale, processing marine products at a rate of up to one ton an hour using a 250,000-curie cobalt-60 radiation source.

The plant will be the second largest cobalt-60 food irradiator in the world with special operating features enabling it to have a production greater than any food irradiator in operation elsewhere--or any known to be in the planning stage. The largest is the U. S. Army's irradiator at Natick, Mass.

The fishery products irradiator is being built to demonstrate the feasibility of extending the refrigerated storage life of fresh fishery products as a part of the AEC radiation-pasteurized food program.

The Bureau's Gloucester Laboratory has been developing plans for consumer acceptance tests of irradiated fishery products.

Note: See Commercial Fisheries Review, September 1963 p. 33.

Salmon

MARKING PROGRAM ON THE COLUMBIA RIVER REVEALS MIGRATION PATTERNS:

Significant information on the Pacific migrating habits of Columbia River salmon is being obtained by "Operation Fin Clip," the gigantic fish-marking program of the U. S. Bureau of Commercial Fisheries. Cooperating State and Canadian fishery agencies report that large numbers of the marked fish have been taken by commercial and sport fishermen in the North Pacific.

"Operation Fin Clip," is designed to determine the contribution made by Columbia River hatcheries to the commercial and sport catch of fall chinook salmon. It involves the marking of approximately 32 million fish over a 4-year period. The Bureau of Commercial Fisheries, which provides about $2 million a year for the operation and maintenance of 22 State and Federal hatcheries on the Columbia River and its tributaries, wants to find out how much they contribute to the total fish catch in order to decide whether it should continue spending money on them.

A summary of the program to mid-1964 showed that a total of 2,223 three-year olds had been recovered from the first 7.5 million marked baby salmon which were released into the River in 1962. The heaviest recoveries were made off the west coast of Vancouver Island, British Columbia. Large concentrations of marked fish were also recaptured off the Oregon and Washington coasts, while relatively small returns were noted in California and Alaskan waters. State and Canadian agencies have stationed trained observers at key spots to tabulate the marked fish as they are brought in by sport and commercial fishermen.

The Bureau of Commercial Fisheries plans to expand the program this year by placing recovery crews on all tributaries of the Columbia below the fish hatcheries. In addition,

efforts will be made to sample Indian catches for marked fish. The crews expected to begin their surveys late in the summer of 1964 when fall chinook start returning from the ocean and begin running upstream to spawn. Other streams also will be surveyed to find out whether there is any straying by the hatchery-bred chinooks from the streams where they were spawned.

To assess sport fishing intensity, an aerial observer in a chartered plane will aid in counting the number of sport fishermen on the main Columbia River between the Dalles Dam and Tongue Point near the mouth of the River. There will also be a pole-count of fishermen on the ground as well as a postal-card survey.

Reports in early August 1964 indicated that hatchery-marked fall chinook salmon had begun entering the Columbia River.

* * * * *

NORTH PACIFIC MIGRATION STUDY OFF WESTERN ALEUTIANS:

In a continuing study on high-seas salmon distribution and abundance in the North Pacific, the U. S. Bureau of Commercial Fisheries research vessel George B. Kelez left Seattle in late Aguust 1964 for a 2-months cruise off the western Aleutian Islands. The main objectives of the cruise are: (1) to determine the western extent and migration routes of immature salmon known to pass through the central Aleutian area each summer; (2) to compare catch rates and selection qualities of surface gill nets and floating long lines; and (3) to test two sound (sonar) systems for detecting salmon. Salmon specimens taken during the cruise will also provide data for studies on the continental origin of North Pacific salmon.

Primary interest during this cruise will center on the area between longitudes 175° E. to 165° E. (Attu Island to Komandorski Island) and between latitudes 50° N. and 54° N. This marks the first attempt of United States research vessels to determine distributional patterns and migration routes of salmon in the central Aleutian area in the late summer and early fall seasons.

School Lunch Program

NATIONAL SCHOOL LUNCH WEEK:

The week of October 11-17 was set aside as National School Lunch Week by Presidential proclamation. Providing a lunch for 17 million youngsters every school day requires a tremendous amount of food. Last year the food bill totaled $876 million. Approximately $688 million of that amount was spent in local food markets.

School-lunch cafeteria serving fish.

For the year ending July 1963, school-lunch purchases of fishery products amounted to 44.9 million pounds valued at $21.8 million, according to the U. S. Department of Agriculture.

Shellfish

FIFTH NATIONAL SHELLFISH SANITATION WORKSHOP TO BE HELD:

The U. S. Public Health Service will hold the fifth National Shellfish Sanitation Workshop November 17-19, 1964, in Washington, D. C. The meeting will bring together members of industry and Government officials who are concerned with shellfish sanitation.

The Workshop will open with a program status report by the Director of the Oyster Institute of North America and a report by a representative of the U. S. Public Health Service. Subjects to be presented and discussed at the Workshop include depuration (cleansing), advances in shellfish culture, imports, bacteriological standards, the use of chemicals on or near shellfish growing areas, a study of a hot dip process, and pro-

posed changes in Parts I, II, and III of the Shellfish Sanitation Manual. The Workshop will conclude with a status report on shellfish sanitation research centers.

* * * * *

NORTH PACIFIC INDUSTRY AFFECTED BY RECENT DISASTERS:

The West Coast shellfish industry was affected by 2 recent disasters--1 natural and the other manmade. Damage to 2 Washington State commercial oyster beds as a result of the tidal wave following the Alaskan earthquake is reported to be over $400,000. Substantial oyster seed plantings in California waters a few weeks prior to the quake were also reported swept away by the tidal action.

The Washington State razor clam industry was adversely affected when a fuel barge loaded with 56,000 barrels of Diesel oil and gasoline ran aground at Moclips, Wash., March 12, 1964, during a coastal storm. Fuel oil leakage destroyed the entire razor clam population along an 8- to 10-mile strip of beach.

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MAINE CONDUCTS RESEARCH ON SANITATION:

An $11,988 research contract on shellfish depuration (cleansing) has been negotiated between the U. S. Public Health Service and the Maine Department of Sea and Shore Fisheries. The contract extends from April 15, 1964, through April 14, 1965, with research to be performed at Boothbay Harbor and Biddeford Pool, Maine. Studies of the flow rate to determine the optimum water flow for depuration of soft clams; the keeping quality of shellfish that have undergone depuration; and salinity acclimatization and its influence on shellfish depuration are some of the projects that will be undertaken.

The Maine Department of Sea and Shore Fisheries has also announced approval of the construction of the first commercially- and privately-operated clam depuration plant in Maine.

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RECLAMATION PROJECT IN NEW YORK STATE:

The New York Legislature has appropriated a $50,000 revolving fund to the State Conservation Department for the purpose of reclaiming shellfish from closed shellfish areas. Initial harvesting operations were begun in Flanders Bay (east end of Long Island) on May 11, 1964, and by July 1964 some 6,000 bushels of clams had been harvested and sold to various Long Island townships for redistribution. The Marine Fisheries Sanitarian in the New York Conservation Department stated that the project has been highly successful and that township officials welcome this means of increasing their shellfish resources.

In related action, the New York Legislature increased penalties for persons taking shellfish from condemned areas. Maximum fines are now $1,500 and confiscation of equipment and/or 1 year imprisonment.

Shrimp

UNITED STATES SHRIMP SUPPLY INDICATORS, JULY 1964:

Item and Period	1964	1963	1962	1961	1960
	. . . (1,000 Lbs. Heads-Off) . . .				
Total landings, So. Atl. and Gulf States:					
September	-	18,045	13,012	9,691	18,832
August	-	19,769	12,340	10,944	20,441
July	15,000	16,291	12,294	10,500	21,746
June	11,197	13,134	11,309	8,233	12,427
January-May	27,790	26,249	20,838	22,797	24,348
January-December	-	138,254	105,839	91,395	141,035
Quantity canned, Gulf States 1/:					
September	-	3,697	1,759	598	2,222
August	-	3,121	1,355	1,090	4,427
July	2,080	3,726	3,551	2,793	5,802
June	4,170	5,234	4,913	3,438	6,920
January-May	1,834	4,778	2,625	1,525	2,114
January-December	-	29,468	23,322	14,500	26,394
Frozen inventories (as of end of each mo.) 2/:					
September 30	-	27,356	12,843	13,361	24,492
August 31	-	24,803	12,754	12,728	20,171
July 31	-	25,460	13,677	14,849	17,397
June 30	25,546	24,047	13,796	19,416	15,338
May 31	28,082	24,053	13,904	24,696	17,540
April 30	28,524	24,954	15,637	27,492	20,502
March 31	31,428	27,970	16,607	31,345	23,232
Imports 3/:					
September	-	10,236	9,696	8,629	8,190
August	-	8,598	7,381	6,743	6,407
July	-	11,002	8,265	6,635	7,319
June	10,528	9,439	9,397	8,065	8,932
January-May	60,274	61,046	54,403	49,103	42,433
January-December	-	151,530	141,103	126,268	113,418
	. .(¢/lb., 26-30 Count, Heads-Off). .				
Ex-vessel price, all species, So. Atl. and Gulf Ports:					
September	-	57.9	90.9	70.1	52.2
August	-	59.0	83.6	66.1	52.0
July	4/58-69	63.5	82.1	55.8	54.6
June	4/60-72	77.0	84.4	53.7	64.1
May	4/59-69	80.9	83.7	52.8	62.9
April	4/57-61	83.6	82.2	55.4	60.6
March	59.6	85.5	80.9	56.0	56.3

(Table continued on next page.)

Item and Period	1964	1963	1962	1961	1960
	. .(¢/lb., 26-30 Count, Heads-Off). .				
Wholesale price, froz. brown (5-lb. pkg.), Chicago, Ill.:					
September	-	73-77	113-118	87-90	65-70
August	-	75-81	110-112	76-91	64-67
July	80-85	77-97	-	70-75	72-77
June	80-85	95-102	102-104	67-72	76-77
May	72-83	100-103	96-103	67-69	74-77
April	72-74	100-105	94-97	69-70	74-75
March	72-75	102-106	94-95	69-71	65-68

1/Pounds of headless shrimp determined by multiplying the number of standard cases by 30.3.
2/Raw headless only; excludes breaded, peeled and deveined, etc.
3/Includes fresh, frozen, canned, dried, and other shrimp products as reported by the Bureau of the Census.
4/Range in prices at Tampa, Fla.; Morgan City, La., area; Port Isabel and Brownsville, Tex., only.
Note: July 1964 landings and quantity used for canning estimated from information published daily by the New Orleans Fishery Market News Service. To convert shrimp to head-on weight multiply by 1.68.

Trout

RAINBOW TROUT EGGS FROM AUSTRALIA HELP EXPAND IDAHO FISH FARM PRODUCTION:

A large United States commercial trout farm in Idaho imported 500,000 rainbow trout eggs from Australia in 1963 to provide new stock during that period of the year when native American rainbow trout are not spawning.

An Australian consignment of 150,000 eggs and another of 117,000 eggs arrived in excellent condition from the Victorian Fisheries and Wildlife Department, and the hatching and survival rate was as high as 90 percent. However, there was a 50-percent mortality rate in the third shipment of 233,000 eggs in October 1963. The losses were caused by the heat and early hatching resulting from a 3-day delay in transit.

The trout hatched from the Australian eggs were reared under the advanced methods developed by the owner of the Idaho farm. The 90 ponds at the farm are fed with flowing water by an extensive underground lake which gushes 250,000 gallons a minute at a temperature of 58° F. all year. Trout at the farm reach market size about a year after hatching. They are fed a diet of fish meal, yeast, whey, soybeans, and alfalfa. The trout are said to grow an inch a month on that diet. Biologists at the farm regularly take blood tests and samples to see that the fish are free of disease and growing properly. After harvesting, the trout are processed by an eviscerating machine capable of cleaning 1,000 fish an hour. The farm also markets live trout.

New breeding methods have been developed at the farm. A stock of rainbow trout has been developed which spawn at the age of 2 years rather than 3 years, and the spawning period is said to have been expanded from 3 to 9 months. The resources of the farm should be further expanded by the addition of the Australian trout. The farm has also developed a special strain of trout--a mutation--and has engaged a computer specialist to assess the prospects of line breeding the new strain. (Australian Fisheries Newsletter, May 1964.)

Note: See Commercial Fisheries Review, Aug. 1964 p. 40.

United States Fisheries

COMMERCIAL FISHERY LANDINGS, JANUARY-JULY 1964:

The United States catch of fish and shellfish in 1964, mostly for the first 7 months (in some instances various periods through August 9), was down about 42 million pounds as compared with the same period in 1963. The decline

Fig. 1 - Baiting a lobster pot aboard a New England lobster boat.

United States Commercial Fishery Landings of Certain Species for Periods Shown, 1964 and 1963

Species	Period	1/1964	1963	Total 1963
		(1,000 Lbs.)		
Anchovies, Calif. 2/	6 mos.	1,500	2,062	3,774
Cod:				
Maine	6 mos.	1,400	1,262	1,960
Mass. 3/	7 "	15,700	19,794	31,475
Total cod		17,100	21,056	33,435
Flounder:				
Maine	6 mos.	700	811	1,216
Mass.	7 "	51,600	52,142	91,876
Total flounder		52,300	52,953	93,092
Haddock:				
Maine	6 mos.	1,300	1,146	2,878
Mass. 3/	7 "	78,300	70,606	106,075
Total haddock		79,600	71,752	108,953
Halibut: 4/				
Alaska	7 mos.	12,700	17,956	22,372
Wash. & Oreg.	7 "	6,200	8,268	11,871
Total halibut		18,900	26,224	34,243
Herring, Maine	6 mos.	10,200	25,108	152,317
Industrial fish, (Me. & Mass.) 5/	6 mos.	14,700	19,035	47,897
Mackerel:				
Jack 2/	6 mos.	35,100	42,932	98,078
Pacific 2/	6 "	4,200	15,196	36,974
Menhaden	7 mos.	924,500	965,208	1,779,500
Ocean perch:				
Maine	6 mos.	22,600	30,116	63,905
Mass.	7 "	18,100	28,954	44,387
Total ocean perch		40,700	59,070	108,292
Pollock (Me. & Mass.) 3/		6,200	6,726	13,216
Salmon, Alaska	to August 9	217,400	171,054	208,000
Scallops, sea, New Bedford (meats)	7 mos.	8,100	9,791	15,941
Shrimp (heads-on), So. Atl. & Gulf	7 mos.	84,800	88,522	219,900
Squid, Calif. 2/	6 mos.	5,700	6,676	7,942
Tuna, Calif.	to August 8	177,300	150,022	285,285
Whiting:				
Maine	6 mos.	4,900	4,169	15,942
Mass.	7 "	23,717	34,547	64,571
Total whiting		28,617	38,716	80,513
Total all above items		1,726,917	1,772,103	3,327,352
Other 6/		249,983	247,224	1,422,793
Grand total		1,976,900	2,019,327	4,750,145

1/Preliminary.
2/Cannery receipts.
3/Landed weight.
4/Dressed weight.
5/Excludes menhaden.
6/Includes landings for species not listed.
Note: Finfish generally converted to round weight, crustaceans to weight in the shell, and mollusks reported in meats only.

occurred principally in landings of menhaden, ocean perch, Maine herring, jack and Pacific mackerel, and whiting. As of August 21, the New England whiting catch was up sharply. Menhaden landings to July 31, 1964, totaled 924.5 million pounds--a drop of 40 million pounds as compared with the same period in 1963. The decline in menhaden landings was limited to the Middle Atlantic area where the catch was only one-third as large as in the same period the previous year.

Fig. 2 - At Gloucester, Mass., a small dragger unloading iced ocean perch into a truck.

Fig. 3 - Unloading haddock from a trawler at Boston Fish Pier.

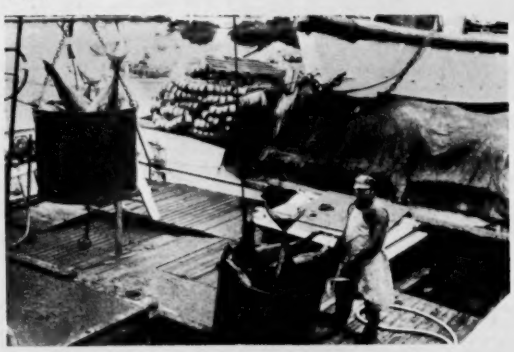

Fig. 4 - Unloading tuna at a southern California dock.

Increased landings were reported principally for salmon in Alaska, tuna, and haddock. On the basis of the reported pack of canned salmon and fresh salmon sales to Japanese freezerships, it was estimated that the catch of salmon to August 9, 1964, totaled 217 million pounds--a gain of 46 million pounds as compared with the same period in 1963.

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FISH STICKS AND PORTIONS PRODUCTION, APRIL-JUNE 1964:

United States production of fish sticks and fish portions amounted to 39.9 million pounds during the second quarter of 1964, according to preliminary data. Compared with the same quarter of 1963, this was a decrease of 2.5 million pounds or 5.9 percent. Fish portions (24.5 million pounds)

Table 1 - U.S. Production of Fish Sticks by Months and Type, April-June 1964 1/

Month	Cooked	Raw	Total
	(1,000 Lbs.)		
April	5,547	394	5,941
May	5,025	397	5,422
June	3,642	451	4,093
Total 2nd Qtr. 1964 1/	14,214	1,242	115,456
Total 2nd Qtr. 1963	17,446	975	18,421
Total 1st 6 months 1964 1/	33,940	2,766	36,706
Total 1st 6 months 1963	40,129	2,140	42,269
Total Jan.-Dec. 1963	74,132	5,163	79,295

1/Preliminary.

Table 2 - U.S. Production of Fish Sticks by Areas, April-June 1964 and 1963

Area	1/ 1964		2/ 1963	
	No. of Firms	1,000 Lbs.	No. of Firms	1,000 Lbs.
Atlantic Coast States	22	11,292	22	15,227
Inland & Gulf States	5	2,365	7	1,997
Pacific Coast States	12	1,799	10	1,197
Total	39	15,456	39	18,421

1/Preliminary.
2/Revised.

Table 3 - U.S. Production of Fish Sticks by Months, 1960-64

Month	1/1964	2/1963	1962	1961	1960
	(1,000 Lbs.)				
January	7,226	7,554	6,082	6,091	5,511
February	7,061	8,241	6,886	7,097	6,542
March	6,963	8,053	7,658	7,233	7,844
April	5,941	6,546	5,719	5,599	4,871
May	5,422	5,750	5,643	5,129	3,707
June	4,093	6,125	5,117	4,928	4,369
July	-	4,870	3,740	3,575	3,691
August	-	5,696	5,760	6,927	5,013
September	-	5,865	6,582	5,206	5,424
October	-	8,128	6,698	6,133	6,560
November	-	6,471	6,305	6,288	6,281
December	-	5,996	6,027	5,618	5,329
Total	-	79,295	72,217	69,824	65,142

1/Preliminary.
2/Revised.

Table 4 - U.S. Production of Fish Portions by Areas, April-June 1964 and 1963

Area	1/1964		2/1963	
	No. of Firms	1,000 Lbs.	No. of Firms	1,000 Lbs.
Atlantic Coast States	21	15,573	23	14,182
Inland & Gulf States	6	8,257	10	9,021
Pacific Coast States	9	627	9	783
Total	36	24,457	42	23,986

1/Preliminary.
2/Revised.

Table 5 - U.S. Production of Fish Portions by Months and Type, April-June 1964 1/

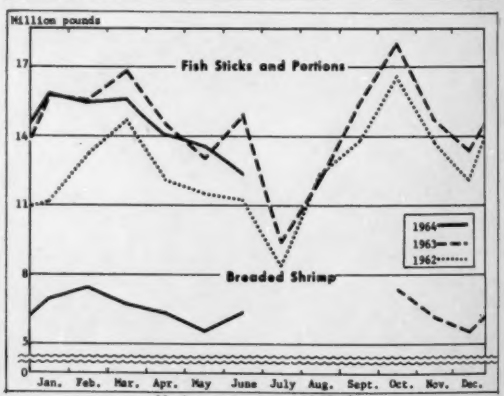
Month	Breaded			Unbreaded	Total
	Cooked	Raw	Total		
	(1,000 Lbs.)				
April	1,917	6,054	7,971	93	8,064
May	1,808	6,162	7,970	166	8,136
June	1,374	6,739	8,113	144	8,257
Total 2nd Qtr. 1964 1/	5,099	18,955	24,054	403	24,457
Total 2nd Qtr. 1963	4,081	19,266	23,347	639	23,986
Total 1st 6 mos. 1964 1/	10,485	38,220	48,705	1,259	49,964
Total 1st 6 mos. 1963	8,220	38,682	46,902	1,453	48,355
Total Jan-Dec. 1963	16,623	74,970	91,593	3,054	94,647

1/Preliminary.

Table 6 - U.S. Production of Fish Portions by Months, 1960-1964

Month	1/1964	2/1963	1962	1961	1960
	(1,000 Lbs.)				
January	8,526	8,173	5,077	4,303	3,632
February	8,397	7,361	6,360	4,902	3,502
March	8,584	8,835	7,036	5,831	4,706
April	8,064	7,919	6,408	4,484	3,492
May	8,136	7,293	5,818	3,879	3,253
June	8,257	8,774	6,137	4,039	3,995
July	-	4,524	4,679	3,962	4,088
August	-	6,684	6,687	4,963	3,558
September	-	9,621	7,180	5,745	4,631
October	-	9,877	9,871	6,759	5,275
November	-	8,136	7,406	5,789	4,790
December	-	7,450	6,019	5,191	4,459
Total	-	94,647	78,678	59,847	49,381

1/Preliminary.
2/Revised.



U. S. production, 1962-64.

were up 0.5 million pounds or 2.1 percent, while fish sticks (15.4 million pounds) were down 3.0 million pounds or 16.3 percent.

Cooked fish sticks (14.2 million pounds) made up 92.0 percent of the April-June 1964 fish stick total. There were 24.1 million pounds of breaded fish portions produced, of which 19.0 million pounds were raw. Unbreaded fish portions amounted to 403,000 pounds.

The Atlantic States remained the principal area in the production of both fish sticks and fish portions, with 11.3 and 15.6 million pounds, respectively. The Inland and Gulf States ranked second with 2.4 million pounds of fish sticks and 8.3 million pounds of fish portions. The remaining 2.4 million pounds of fish sticks and fish portions were produced by firms in the Pacific States.

U.S. Foreign Trade

IMPORTS OF CANNED TUNA IN BRINE UNDER QUOTA:

United States imports of tuna canned in brine during January-August 1, 1964, amounted to 21,726,482 pounds (about 1,034,600 standard cases), according to preliminary data compiled by the U. S. Bureau of Customs. This was substantially less (25.2 percent) than the 29,036,028 pounds (about 1,382,700 standard cases) imported during January 1-August 3, 1963.

The quantity of tuna canned in brine which can be imported into the United States during the calendar year 1964 at the 12½-percent rate of duty is limited to 60,911,870 pounds (or about 2,900,565 standard cases of 48 7-oz. cans). Any imports in excess of that quota will be dutiable at 25 percent ad valorem.

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PROCESSED EDIBLE FISHERY PRODUCTS, JUNE 1964:

United States imports of processed edible fishery products in June 1964 were up 3.2 percent in quantity and 12.4 percent in value from those in the previous month. In June there were larger imports of canned sardines not in oil, fresh and frozen groundfish fillets, and most other fish fillet items (except sea catfish fillets). The increase was almost offset by smaller shipments of fish blocks and slabs, sea catfish fillets, and canned albacore tuna in brine.

Compared with the same month in 1963, imports in June 1964 were up 9.1 percent in quantity and 19.8 percent in value. This June there were larger imports of flounder fillets, halibut steaks, swordfish steaks, yellow pike fillets, canned oysters, and canned sardines in oil and not in oil. But there was a considerable decline in arrivals of groundfish fillets and blocks and slabs as a result of smaller shipments from countries in Western Europe.

In the first 6 months of 1964, imports were up 1.3 percent in quantity and 5.3 percent in value from those in the same period of 1963. During January-June 1964, there was a sharp increase in imports of fish blocks and slabs, flounder fillets, and yellow pike fillets. But there was a considerable decline in imports of canned tuna, canned sardines, and canned crab meat.

Exports of processed edible fish and shellfish from the United States in June 1964 were up 27 percent in quantity and 17 percent in value from those in the previous month due to larger shipments of canned shrimp (increase mostly to Canada and the United Kingdom), canned mackerel, and canned sardines in oil and not in oil. Exports of canned salmon (principally to the United Kingdom) showed little change from the previous month. There was a modest decline in exports of canned squid due to smaller shipments to Greece.

U. S. Imports and Exports of Processed Edible Fishery Products, June 1964 with Comparisons

Item	Quantity				Value			
	June		Jan.-June		June		Jan.-June	
	1964	1963	1964	1963	1964	1963	1964	1963
	(Millions of lbs.)				(Millions of $)			
Fish & Shellfish:								
Imports[1]	38.4	35.2	243.9	240.8	12.7	10.6	73.4	69.7
Exports[2]	3.3	2.0	20.8	16.6	1.4	1.0	9.0	6.6

1/Includes only those fishery products classified by the U. S. Bureau of the Census as "Manufactured foodstuffs." Included are canned, smoked, and salted fishery products. The only fresh and frozen fishery products included are those involving substantial processing, i. e., fish blocks and slabs, fish fillets, and crab meat. Does not include fresh and frozen shrimp, lobsters, scallops, oysters, and whole fish (or fish processed only by removal of heads, viscera, or fins, but not otherwise processed).
2/Excludes fresh and frozen.

Compared with the same month of the previous year, the exports in June 1964 were up 65 percent in quantity and 40 percent in value. This June there were larger shipments of most of the leading canned fish export items except canned squid. Exports of canned salmon to the United Kingdom this June increased 319 percent from those in the same month a year earlier.

Processed fish and shellfish exports in the first 6 months of 1964 were up 25 percent in quantity and 36 percent in value from those in the same period of 1963. In January-June 1964 there were much larger shipments of canned mackerel. Shipments of canned salmon, canned sardines in oil, and canned shrimp were also higher, but exports of canned sardines not-in-oil and canned squid were down sharply.

Notes: (1) Prior to October 1963, the data shown were included in articles on "U. S. Imports and Exports of Edible Fishery Products." Before October 1963, data showing "U. S. Imports of Edible Fishery Products" summarized both manufactured and crude products. At present, a monthly summary of U. S. imports of crude or nonprocessed fishery products is not available; therefore, only imports of manufactured or processed fishery products are reported. The import data are, therefore, not comparable to previous reports of "U. S. Imports of Edible Fishery Products."

The export data shown are comparable to previous data in "U. S. Exports of Edible Fishery Products." The export data in this series of articles have always been limited to manufactured or processed products.

(2) See Commercial Fisheries Review, Sept. 1964 p. 45.

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AIRBORNE IMPORTS OF FISHERY PRODUCTS, JANUARY-APRIL 1964:

Airborne fishery imports into the United States in April 1964 were up 37.0 percent in quantity and 46.4 percent in value from those in the previous month due mainly to larger shipments of shrimp, particularly from Venezuela.

Total airborne shrimp imports in April 1964 consisted of 544,100 pounds of fresh and frozen raw headless and 34,247 pounds of unclassified shrimp. About 97 percent of the airborne shrimp arrivals in April 1964 entered through the Customs District of Florida. The remainder entered through the Customs Districts of New Orleans (La.) and Los Angeles (Calif.).

Airborne imports of shellfish other than shrimp in April 1964 included Caribbean shipments of 30,446 pounds of spiny lobster products most of which entered through the Customs District of Florida, with the remainder going to Puerto Rico.

Airborne finfish imports in April 1964 consisted mainly of fish fillets from Mexico.

Total airborne fishery imports in January-April 1964 were down 25.1 percent in quantity and 28.9 percent in value from

U. S. 1/Airborne Imports of Fishery Products, January-April 1964 with Comparative Data

Product and Origin 2/	April 1964 Qty. 3/	April 1964 Value 4/	Jan.-Apr. 1964 Qty. 3/	Jan.-Apr. 1964 Value 4/	Jan.-Apr. 1963 Qty. 3/	Jan.-Apr. 1963 Value 4/
	1,000 Lbs.	US$ 1,000	1,000 Lbs.	US$ 1,000	1,000 Lbs.	US$ 1,000
Fish:						
Portugal	-	-	0.1	0.1	-	-
Mexico	29.3	8.0	108.8	30.4	99.2	31.1
British Honduras	-	-	1.8	0.4	30.6	7.6
Honduras	-	-	-	-	15.5	4.0
Japan	-	-	-	-	2.0	8.2
United Kingdom	-	-	1.7	3.2	1.1	2.7
Iran	-	-	-	-	1.2	7.4
France	0.4	0.6	4.3	7.8	0.4	0.3
Israel	-	-	1.3	0.8	-	-
Venezuela	-	-	4.6	1.7	-	-
Ireland	-	-	-	-	0.8	0.3
Denmark	-	-	0.2	0.1	-	-
Canada	-	-	13.2	4.3	-	-
Iceland	-	-	1.8	1.2	-	-
Spain	0.8	0.6	0.8	0.6	-	-
Total fish	30.5	9.2	138.6	50.6	150.8	61.6
Shrimp:						
Guatemala	-	-	-	-	101.5	53.9
El Salvador	57.0	35.5	144.1	86.4	145.2	101.7
Honduras	-	-	-	-	5.8	3.3
Nicaragua	24.5	13.9	31.1	18.0	193.4	61.6
Costa Rica	9.3	4.6	149.2	82.4	284.0	137.3
Panama	85.6	51.7	335.2	196.9	607.7	326.4
Venezuela	391.4	194.7	1,529.4	661.3	1,464.8	715.4
Ecuador	-	-	-	-	72.4	23.1
France	-	-	-	-	2.6	0.9
British Guiana	10.5	5.2	10.5	5.2	-	-
Total shrimp	578.3	305.6	2,199.5	1,050.2	2,877.4	1,423.6
Shellfish other than shrimp:						
Mexico	-	-	9.0	4.8	70.9	41.5
British Honduras	15.2	3.4	82.8	50.4	98.2	76.4
El Salvador	-	-	-	-	5.0	3.6
Honduras	-	-	8.4	8.6	1.6	0.8
Nicaragua	10.3	9.1	50.5	40.0	47.8	37.9
Costa Rica	-	-	9.3	9.5	73.8	60.1
Jamaica	11.6	10.0	43.6	36.2	44.3	33.4
Netherlands Antilles	-	-	-	-	29.1	18.3
Colombia	-	-	-	-	2.9	4.5
Ecuador	-	-	-	-	2.2	1.8
Tunisia	-	-	-	-	0.5	0.6
British Guiana	-	-	8.6	1.6	1.7	0.3
Canada	-	-	1.2	0.9	1.8	0.7
Venezuela	-	-	-	-	13.7	6.0
Dominican Republic	3.1	0.5	3.6	0.6	6.2	5.0
Bahamas	4.1	3.7	10.6	6.8	-	-
Haiti	1.3	0.7	4.0	2.1	-	-
Other countries	0.2	0.2	0.2	0.2	1.6	0.5
Total shellfish (excl. shrimp)	45.8	27.6	231.8	161.7	401.3	291.4
Grand total	654.6	342.4	2,569.9	1,262.5	3,429.5	1,776.6

1/Imports into Puerto Rico from foreign countries are considered to be United States imports and are included. But United States trade with Puerto Rico and with United States possessions and trade between United States possessions are not included.
2/When the country of origin is not known, the country of shipment is shown.
3/Gross weight of shipments, including the weight of containers, wrappings, crates, and moisture content.
4/F.o.b. point of shipment. Does not include U. S. import duties, air freight, or insurance.
5/Less than 50 pounds.
Note: These data are included in the overall import figures for total imports, i.e., these imports are not to be added to other import data published.
Source: United States Airborne (Census) Imports of Merchandise, FT 380, April 1964, U. S. Bureau of the Census.

those in the same period of 1963. The decline was due to smaller shipments of shrimp and spiny lobster tails.

The data as issued do not show the state of all products--fresh, frozen, or canned--but it is believed that the bulk of the airborne imports consists of fresh and frozen products.

Wholesale Prices

EDIBLE FISH AND SHELLFISH, AUGUST 1964:

The wholesale price index for edible fish and shellfish (fresh, frozen, and canned) dropped 1.1 percent from July to August 1964 mainly because of lower fresh and frozen shrimp prices. August prices for other fresh fishery products and canned fish were invariably higher or remained at the same level as in July except for lower prices on ex-vessel large haddock and frozen ocean perch fillets. At 105.4 percent of the 1957-59 average, the index this August was lower by only 0.1 percent from the same month a year earlier. Lower prices for a number of fresh and frozen fishery products this August than in August 1963 were offset by higher prices for fresh and frozen shrimp, fresh halibut, and most of the canned fish items.

A decline of 0.3 percent from July to August in the subgroup index for drawn, dressed, or whole finfish was the direct result of lower ex-vessel prices at Boston for large haddock (down 6.0 percent). August prices for western fresh halibut at New York City rose 3.7 percent from the previous month because of a drop in seasonal Pacific Northwest halibut landings, and those prices were up 7.8 percent as compared with August 1963. Prices this August were higher than in July for Great Lakes fresh yellow pike (up 5.9 percent), but were unchanged for other items in the subgroup. As compared with August 1963, all items in the subgroup except halibut were lower-priced this August and the subgroup index was down by 1.2 percent.

The subgroup index for processed fresh fish and shellfish in August 1964 was down 4.2 percent from the previous month. Lower prices for South Atlantic fresh shrimp (down 8.9 percent) at New York City were largely responsible, but prices for fresh haddock fillets at Boston rose (up 2.9 percent). As compared with the same month a year earlier, the subgroup index this August was lower by 3.3 percent because of lower prices for haddock fillets and shucked standard oysters, while fresh shrimp prices were 9.3 percent higher than in August 1963.

From July to August, prices dropped for ocean perch fillets (down 1.7 percent) at Boston and frozen shrimp (down 4.1 percent) at Chicago, and the subgroup index for frozen fish and shellfish dropped 2.4 percent. Prices for other fish fillets in the subgroup were unchanged from the previous month. As compared with August 1963, the subgroup index this August was higher by 1.1 percent because of higher prices for frozen shrimp and haddock fillets.

The subgroup index for canned fishery products was up 0.9 percent from July to August as a result of price increases for canned tuna (up 0.5 percent) and canned Maine sardines (up 5.7 percent). Because of intensive advertising, demand for tuna was up but price increases in August were nominal and confined only to certain packers' brands. But canned tuna prices in the aggregate were 6.2 percent higher this August than in the same month of 1963. Higher prices for canned Maine sardines generally stemmed from the relatively light 1964 season pack. As of August 29, the new pack was 525,000 cases--substantially less than the pack of 1.3 million cases for the same period in 1963. Prices for canned pink salmon this August were unchanged from the previous month, but supplies will continue liberal. The total Alaska salmon pack this year was about 3.4 million cases as of the end of August, with pink salmon accounting for more than half of the total. The subgroup index this August was lower than in August 1963 by 1.5 percent. Prices for all items in the subgroup were above those of a year earlier, but canned pink salmon prices were 7.3 percent lower because of liberal supplies.

Wholesale Average Prices and Indexes for Edible Fish and Shellfish, August 1964 with Comparisons

Group, Subgroup, and Item Specification	Point of Pricing	Unit	Avg. Prices 1/ ($)		Indexes (1957-59=100)			
			Aug. 1964	July 1964	Aug. 1964	July 1964	June 1964	Aug. 1963
ALL FISH & SHELLFISH (Fresh, Frozen, & Canned)					105.4	106.6	105.6	105.5
Fresh & Frozen Fishery Products:					106.9	109.3	107.8	108.0
Drawn, Dressed, or Whole Finfish:					114.6	114.9	106.3	116.0
Haddock, lge., offshore, drawn, fresh	Boston	lb.	.11	.11	83.3	88.6	75.2	84.6
Halibut, West., 20/80 lbs., drsd., fresh or froz.	New York	lb.	.42	.40	122.7	118.3	107.0	113.8
Salmon, king, lge. & med., drsd., fresh or froz.	New York	lb.	.93	.93	129.2	129.2	124.7	129.2
Whitefish, L. Superior, drawn, fresh	Chicago	lb.	.53	.53	78.3	78.3	63.4	98.5
Yellow pike, L. Michigan & Huron, rnd., fresh	New York	lb.	.54	.51	88.4	83.5	69.6	104.8
Processed, Fresh (Fish & Shellfish):					101.1	105.5	114.8	104.5
Fillets, haddock, sml., skins on, 20-lb. tins	Boston	lb.	.36	.36	86.2	83.8	77.7	91.1
Shrimp, lge. (26-30 count), headless, fresh	New York	lb.	.77	.84	89.6	98.4	117.2	82.0
Oysters, shucked, standards	Norfolk	gal.	7.00	7.00	118.0	118.0	118.0	134.9
Processed, Frozen (Fish & Shellfish):					100.0	102.5	98.7	98.9
Fillets: Flounder, skinless, 1-lb. pkg.	Boston	lb.	.38	.38	96.0	96.0	92.5	98.9
Haddock, sml., skins on, 1-lb. pkg.	Boston	lb.	.37	.37	108.5	108.5	101.1	105.5
Ocean perch, lge., skins on 1-lb. pkg.	Boston	lb.	.31	.31	106.9	108.7	105.2	115.7
Shrimp, lge. (26-30 count), brown, 5-lb. pkg.	Chicago	lb.	.80	.84	94.9	99.0	96.6	93.1
Canned Fishery Products:					103.1	102.2	102.2	101.6
Salmon, pink, No. 1 tall (16 oz.), 48 cans/cs.	Seattle	cs.	22.25	22.25	97.0	97.0	97.0	104.6
Tuna, lt. meat, chunk, No. 1/2 tuna (6-1/2 oz.), 48 cans/cs.	Los Angeles	cs.	11.56	11.50	102.6	102.1	102.1	96.6
Mackerel, jack, Calif., No.1 tall (15 oz.), 48 cans/sc.	Los Angeles	cs.	6.25	6.25	105.9	105.9	105.9	97.5
Sardines, Maine, keyless oil, 1/4 drawn (3-3/4 oz.), 100 cans/cs.	New York	cs.	9.31	8.81	119.4	113.0	113.0	104.0

1/Represent average prices for one day (Monday or Tuesday) during the week in which the 15th of the month occurs. These prices are published as indicators of movement and not necessarily absolute level. Daily Market News Service "Fishery Products Reports" should be referred to for actual prices.

SHRIMP FARMING

The idea of shrimp farming, or cultivation of shrimp under controlled conditions in salt- or brackish-water ponds, has aroused much interest in the United States in recent years. Shrimp appear particularly desirable for artificial cultivation because of their rapid growth and high market value. In addition to their worth as human food, shrimp are in great demand seasonally as live bait for sport fishing.

Methods used in shrimp farming take advantage of the ability of certain shrimp to survive and grow rapidly in shallow estuarine waters. By constructing ponds, the shrimp farmer alters the natural environment so that the poundage of shrimp normally harvested from the estuarine areas is greatly increased. It is anticipated that by proper timing, a shrimp farmer may control the development of his stocks, so that abundant live-bait shrimp of appropriate size can be harvested at the peak of demand.

The culture of shrimp and other marine animals is an important industry in certain maritime countries of Southeast Asia. Shrimp farming in the United States is still in its infancy, however, and extensive research is required to determine its biological and economic feasibility.

Note: Shrimp culture as it is practiced in Southeast Asia and possible application of techniques developed there to shrimp farming in the United States are discussed in Fishery Leaflet 551, "Shrimp Farming," U. S. Bureau of Commercial Fisheries, Washington, D. C.

International

FISH MEAL

PRODUCTION AND EXPORTS FOR SELECTED COUNTRIES, JANUARY-MAY 1963-1964:

Member countries of the Fish Meal Exporters' Organization (FEO) account for about 90 percent of world exports of fish meal. The FEO countries are Chile, Angola, Iceland, Norway, Peru, and South Africa/South-West Africa. Production and exports of fish meal by FEO countries during January-May 1964 were up substantially from that same period of the previous year.

Table 1 - Exports of Fish Meal by Member Countries of the FEO, January-May 1963-1964

Country	May		Jan.-May		Total
	1964	1963	1964	1963	1963
	(1,000 Metric Tons)				
Chile	9.2	1/	62.2	1/	1/
Angola	2/	2.4	2/	11.5	30.0
Iceland	7.2	7.2	47.7	34.0	99.1
Norway	17.5	7.4	95.4	36.0	102.1
Peru	133.0	78.1	664.0	529.7	1,159.4
So. Africa (including S.-W. Africa)	27.5	14.1	90.2	56.3	198.8
Total	194.4	109.2	959.5	667.5	1,589.4

Table 2 - Production of Fish Meal by Member Countries of the FEO, January-May 1963-1964

Country	May		Jan.-May		Total
	1964	1963	1964	1963	1963
	(1,000 Metric Tons)				
Chile	14.5	1/	75.3	1/	86.8
Angola	2/	2.3	2/	10.8	31.5
Iceland	4.5	4.6	35.7	34.8	87.2
Norway	11.2	10.6	86.1	25.6	132.2
Peru	123.4	160.2	777.8	602.9	1,159.2
So. Africa (including S.-W. Africa)	33.4	33.2	130.0	114.7	238.0
Total	187.0	210.9	1,104.9	788.8	1,734.9

1/Data not available. Chile became a member of FEO at the end of 1963.
2/Data not reported. January 1964 exports were 4,800 tons; January 1964 production was 5,600 tons.

During the first 5 months of 1964, Peru accounted for 69.2 percent of total fish-meal exports reported by FEO countries, followed by Norway with 9.9 percent, South Africa with 9.4 percent, Chile with 6.5 percent, and Iceland with 5.0 percent. (Regional Fisheries Attache for Europe, United States Embassy, Copenhagen, July 15, 1964.)

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WORLD PRODUCTION, APRIL-MAY 1964 AND JANUARY-MAY 1964:

World fish meal production in April 1964 held steady at about the same level as in the previous month and then moved somewhat lower in May 1964, according to preliminary data from the International Association of Fish Meal Manufacturers. The modest decline in May 1964 was due mainly to a drop in output in Peru, Norway, and Iceland, which was partly offset by rising production in the United States.

World Fish Meal Production by Countries, January-May 1963-1964

Country	April		May		Jan.-May	
	1964	1963	1964	1963	1964	1963
	(Metric Tons)					
Canada	1,460	1,311	3,941	5,020	16,401	31,944
Denmark	6,591	7,081	8,466	10,267	30,074	35,959
France	1,100	1,100	1,100	1,100	5,500	5,500
German Fed. Republic	6,736	7,461	5,279	5,795	31,550	33,128
Netherlands	500	500	400	300	2,900	1,700
Spain	1/	2,180	1/	1,673	1/	10,869
Sweden	885	822	531	754	3,428	2,783
United Kingdom	7,217	6,438	5,467	5,752	33,812	32,193
United States	6,434	2/7,565	24,765	2/36,195	2/36,612	2/50,970
Angola	1/	1,345	1/	2,276	3/5,566	11,174
Iceland	10,094	8,742	4,547	4,602	35,669	34,814
Norway	31,582	4,000	11,228	10,649	86,048	25,019
Peru	158,505	129,104	123,336	160,209	777,778	602,850
So. Africa (incl. S.-W. Africa)	31,543	33,237	33,297	32,278	134,277	113,604
Belgium	375	375	375	375	1,875	1,875
Chile	13,343	1/	14,501	1/	75,253	1/
Morocco	350	1/	2,150	1/	4,060	1/
Total	276,715	211,261	239,383	277,245	1,280,803	994,382

1/Data not available.
2/Revised.
3/Data available only for January 1964.
Note: Japan does not report fish meal production to the International Association of Fish Meal Manufacturers at present. Chile and Morocco did not report production prior to 1963.

World fish meal production in the first 5 months of 1964 was considerably above that in the same period of 1963. The increase was due largely to expanded production in Peru which accounted for about 61 percent of world output during January-May 1964. There was also a noticeable increase in Norwegian and South African production in January-May 1964. The gain was offset partly by a sharp drop in Canadian and United States output.

Most of the principal countries producing fish meal submit data to the Association monthly (see table).

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WORLD TRADE, 1958-1963:

World exports of fish meal, including fish solubles and similar products, reached a record level in 1963, reflecting increased shipments from all major suppliers except Angola (table 1).

International (Contd.):

Table 1 - Fish Meal 1/ Exports from Specified Countries, 1958-1963 and Average 1955-59

Country	2/1963	1962	1961	1960	1959	1958	Average 1955-59
	(1,000 Short Tons)						
Canada 3/	56.7	48.2	40.6	35.5	46.9	29.3	44.3
Argentina	3.5	1.7	.3	.1	2.7	2.5	1.9
Chile	95.7	80.3	45.8	26.6	19.1	11.9	10.0
Peru	1,278.4	1,175.0	838.4	571.3	306.1	117.4	109.1
Belgium	3.4	6.4	4.2	4.7	2.3	2.0	2.4
Denmark 3/	74.5	68.0	47.1	35.4	77.7	66.8	54.8
Faroe Islands	1.9	2.2	1.2	.9	.7	.6	.6
France	2.0	1.7	3.7	4.6	.8	.9	4/1.1
West Germany	6.0	9.5	.9	6.3	8.0	8.5	6.8
Iceland	114.8	76.8	78.0	60.5	48.7	60.2	42.1
Netherlands	3.9	6.6	5.2	6.2	9.2	6.7	6.7
Norway	113.9	65.9	141.6	112.4	98.3	118.0	148.0
Portugal	.8	2.9	5.0	2.5	.6	1.5	1.3
Sweden	.3	.3	.6	.3	1.1	1.5	.9
U.S.S.R.	5/4.0	4.1	5.4	4.4	5.3	4.2	4.1
Angola	30.8	35.9	55.5	49.7	56.5	89.6	72.8
Morocco	21.9	17.6	20.9	15.3	16.0	18.4	13.0
So. Africa Republic 3/6/	235.8	228.7	186.7	139.7	110.1	98.6	78.9
Japan	4.0	20.0	5.3	6.9	26.5	26.1	15.4
Total	2,052.3	1,851.8	1,486.4	1,083.3	836.6	664.7	614.2

1/Includes fish solubles and similar products.
2/Preliminary.
3/Includes fish solub.es.
4/1957-59 average.
5/Estimate.
6/Includes the production of South-West Africa.

Table 2 - Fish Meal Imports into Specified Countries, 1958-1963 and Average 1955-59

Country	1/1963	1962	1961	1960	1959	1958	Average 1955-59
	(1,000 Short Tons)						
Canada	3.0	.1	6.4	2.1	-	-	-
Mexico	30.7	22.1	13.6	16.8	10.4	4.0	3.9
United States	386.5	255.8	221.4	133.5	147.3	109.0	107.7
Colombia 2/	2.8	1.8	.6	.6	-	-	.2
Venezuela	16.6	14.6	12.9	4.8	5.0	2.8	2.9
Austria	33.4	30.9	26.5	24.0	14.1	16.1	12.7
Belgium	56.6	62.8	44.0	54.8	32.9	31.0	24.7
Denmark	13.6	17.1	30.6	20.8	14.8	12.0	12.8
Finland	8.0	17.8	13.7	7.2	3.9	3.8	3.3
France	84.3	90.9	66.4	35.1	43.9	46.5	30.5
West Germany	332.4	365.8	295.3	212.6	166.1	137.0	128.1
Ireland	8.2	5.8	4.8	4.4	4.3	5.0	3.4
Italy	67.5	53.6	34.3	33.7	14.6	15.9	10.7
Netherlands	193.7	190.2	178.9	150.3	110.1	92.5	88.0
Poland	33.1	17.3	11.8	7.1	2.2	1.6	2.1
Spain	84.1	41.5	14.6	10.2	-	2.7	1.4
Sweden	33.0	26.1	24.5	19.3	20.6	12.6	13.7
Switzerland 2/	32.0	31.4	27.4	30.5	17.0	14.6	14.0
United Kingdom	310.5	305.0	257.6	186.3	164.7	127.0	127.2
Yugoslavia	3/24.7	3.1	3.8	13.9	8.1	-	1.8
Rhodesia/ Nyasaland	4/5.5	5.4	5.9	4.7	5.3	5.4	4/4.9
Israel	11.3	5/11.0	13.1	17.7	13.3	22.3	14.3
Japan	92.9	42.4	25.7	21.4	-	-	-
Malaysia	5/9.7	16.8	15.1	11.6	6.8	5.0	3.6
Philippines	4/7.0	6.9	10.3	3.3	5.4	3.8	3.8
Total	1,881.1	1,636.3	1,359.2	1,026.7	810.8	670.6	615.7

1/Preliminary.
2/Includes small amounts of meat meal.
3/January-September.
4/Estimated.
5/January-June.

Fish meal is a high-protein concentrate that contains the amino acids necessary to good animal nutrition. As animal feed, it is usually incorporated in balanced mixtures of vegetable substances to which minerals and vitamins are added. The bulk of fish meal production is used in poultry and hog rations and, when prices are competitive with other protein concentrates, in other livestock rations.

In general, exports of fish meal follow the pattern of production as the greater part of the output is exported in major producing countries such as Peru, South Africa Republic, Norway, Iceland, Denmark, Angola, and Morocco. The main exceptions are the United States, Japan, and the Soviet Union where virtually all the production is retained for domestic use.

There has been a marked change in the regional pattern of world exports. Prior to 1959, Europe was the leading exporting region but with the rapid development in the productive capacity for fish meal in other parts of the world, South America has become the leading exporting region and Africa has emerged as an important source of supply. Exports from North America continue, as in the past, almost entirely from Canada. Asian exports are insignificant compared with those from other regions.

Peru continued as the leading fish meal supplier in 1963. By areas of destination the percentage distribution of Peruvian fish-meal shipments in 1963 was as follows: Western Europe 61.2 percent; North and South America 25.0; Eastern Europe 7.0; Asia 6.4; and Oceania 0.4 percent.

Record quantities of fish meal were shipped from the South Africa Republic in 1963. Western Europe absorbed 56 percent of South African fish-meal exports in 1963, followed by Asia with 18 percent, Eastern Europe with 14 percent, North and South America with 5 percent, Africa with 3 percent, and Oceania with 2 percent.

Exports of fish meal from Norway and Iceland increased significantly in 1963. Virtually all shipments from both those countries in 1963 went to other Western European countries, except for small quantities (about 14 percent in 1963) which were sold to Eastern Europe.

Chile's exports of fish meal, which have been increasing steadily in recent years, totaled a record 95,700 tons in 1963. Chilean fish-meal exports in 1963 were mainly to Western Europe which took 60 percent of the total. Of the remainder, North and South America accounted for 37 percent, Eastern Europe 2 percent, and Asia 1 percent.

The greater part of the fish-meal shipments from Denmark, Angola, and Morocco goes to Western Europe except for small quantities (about 12 percent in 1963) going to Eastern Europe. Over 80 percent of Canadian exports of fish meal in 1963 went to the United States, and most of the remainder went to the United Kingdom.

Most of the increase in world supplies of fish meal since 1959 has been absorbed by Western European countries and by the United States, now the world's leading fish-meal importer. Increased imports have also been recorded by countries in South and Central America, Asia, and Eastern Europe.

Combined imports in 1963 by leading fish-meal buyers increased considerably over 1962 (table 2). Purchases by the United States rose 130,700 tons, and those by Japan, Spain, Yugoslavia, Italy, and Poland rose collectively by 144,400 tons. Those increases more than offset reduced purchases by West Germany, Finland, France, Belgium, and Denmark.

In Eastern Europe, estimated purchases of fish meal by East Germany fell to 80,000 tons in 1963 from 102,000 in 1962. Imports into Czechoslovakia and Hungary, however, increased in 1963 to an estimated 17,500 and 20,500 tons, respectively, from an estimated 17,000 and 16,500 tons in 1962. (World Agriculture Production and Trade, July 1964.)

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INTERNATIONAL ASSOCIATION OF FISH MEAL MANUFACTURERS' FIFTH ANNUAL CONFERENCE:

The Fifth Annual Conference of the International Association of Fish Meal Manufacturers will be held in Vienna, Austria, September 29-October 2, 1964.

International (Contd.):

The Association, which was formed in 1959, is a recognized international body representing the world fish meal industry as a whole, and is designed to promote cooperation among all manufacturers. It thus provides a forum for discussions between producers, many of whom are also engaged in foreign trade, and experts who are concerned with the many commercial promotional, scientific, and technical problems affecting the industry.

Over 100 delegates from the 17 member countries, as well as official observers from Japan, Mexico, and Argentina, were expected to attend the Vienna Conference. In addition, agents, importers, and brokers who are interested in fish meal marketing were invited to attend the opening and closing sessions, and to be present as observers at a special working session.

Member countries, all of whom were expected to send delegates to the Conference, are: Belgium, Canada, Chile, Denmark, France, West Germany, the Netherlands, Iceland, Morocco, Norway, Peru, Portugal, So. Africa Republic, Spain, Sweden, the United Kingdom, and the United States.

Organizations and agencies which were to be represented at the Conference include the Fishmeal Exporters Organization (FEO), with which the Association cooperates on promotional and similar matters; the U. S. Bureau of Commercial Fisheries, which is actively engaged in research on fish protein concentrate for human nutrition; and the Food and Agriculture Organization (FAO) of the United Nations.

Fish meal is easily incorporated as a high-grade protein ingredient in animal feeds, particularly for intensively reared stock such as poultry and pigs. Fish flour or fish protein contrate for human consumption may become an important factor in combating malnutrition. In those and other activities the Association cooperates with FAO; the United Nations Children's Fund (UNICEF); and the Freedom from Hunger Campaign. The Association also cooperates with groups such as the European Federation for Animal Technology (FEZ) and other regional bodies such as the Expert Committee in the European Economic Community. (International Association of Fish Meal Manufacturers, July 1964.)

MARINE OIL

WORLD PRODUCTION, 1963:

In 1963, world production of marine oils (excluding seal oil) totaled an estimated 1,071,500 short tons, 16 percent below that of the previous year. Production of baleen whale oil and fish oil declined by an estimated 109,700 and 94,200 tons, respectively. Sperm oil production, however, rose 5 percent in 1963.

World Marine Oil Production, 1961-63

Item	1/ 1963	1962	1961
	(1,000 Short Tons)		
Baleen whale oil	280.4	390.1	427.7
Sperm whale oil	135.8	129.8	119.9
Fish and fish-liver oil	655.3	749.5	668.6
Total	1,071.5	1,269.4	1,216.2

1/Preliminary.

The production of seal oil in 1963 is estimated at 3,600 tons, compared with an estimated 4,600 tons produced in 1962.

INTERNATIONAL PACIFIC HALIBUT COMMISSION

NORTH PACIFIC HALIBUT FISHING IN AREA 3A ENDED AUGUST 19, 1964:

Fishing in Pacific halibut Area 3A ended at 6 p.m. (P.S.T.) on August 19, 1964. The International Pacific Halibut Commission announced the closure on July 31, 1964, since it estimated that by August 19 the catch limit of 34 million pounds for Area 3A would be reached. Area 3A includes waters off the coast of Alaska between Cape Spencer and Kupreanof Point (near the Shumagin Islands). There will be no halibut fishing in Area 3A after August 19, 1964, until the area is reopened in 1965.

This year Area 3A was open to fishing for 110 days--18 days more than the 92-day season in 1963. In 1962, the area was open to fishing for 94 days, in 1961 for 105 days, in 1960 for 85 days, in 1959 for 92 days, and in 1958 for 119 days.

North Pacific halibut landings by United States and Canadian vessels for 1964 through July 31, 1964, were: 14.4 million pounds in Area 2; 26.3 million pounds in Area 3A; 2.1 million pounds in Area 3B South; 359,000 pounds in Area 3B North; and 1.5 million pounds in Area 3B North Triangle. Total United States and Canadian landings as of July 31, 1964, totaled 44.7 million pounds as compared with 56.7 million pounds for the same period of 1963.

There has been no announcement concerning the closure of any of the other North Pacific halibut fishing areas which are subject to quota limitation. The North Pacific halibut fishing regulations for 1964 provide that the season in Area 2 shall terminate at the time of the attainment of a catch limit of 25 million pounds or on September 15, whichever is earlier; fishing in Area 3B South shall terminate at the time of the attainment of a catch limit of 4 million pounds or on October 15, whichever is earlier; fishing in Area 3B North (without catch limit) shall terminate on October 15; and the season in Area 3B North Triangle shall terminate at the time of the attainment of a catch limit of 6,393,340 pounds or on October 15, whichever is earlier (the catch limit in Area 3B North Triangle is to be shared between the United States, Canada, and Japan).

The halibut catch during the 1964 season in Area 2 and the Bering Sea areas has been substantially below that during the previous sea-

International (Contd.):

son. Those developments were considered at a special meeting of the International Pacific Halibut Commission on June 4, 1964. Following the meeting it was announced that the catch-limit area of the Bering Sea was tentatively scheduled for complete closure during 1965 and that North Pacific halibut fishing off the United States and Canadian coasts would be closely surveyed to determine if further restrictions would be required.

Note: See Commercial Fisheries Review, August 1964 p. 49.

INTER-GOVERNMENTAL MARITIME CONSULTATIVE ORGANIZATION

PANEL OF EXPERTS ON STABILITY OF FISHING VESSELS HOLDS FIRST SESSION IN LONDON, JULY 13-17, 1964:

A Panel of Experts on Stability of Fishing Vessels has been established by the Inter-Governmental Maritime Consultative Organization (IMCO). The action was taken following the third IMCO Assembly, which resolved that "IMCO should continue its studies on the stability of fishing vessels with all possible speed." The Panel will serve as a subsidiary body to the Working Group on Intact Stability of Ships, which is already concerned with stability studies of all types of ships including fishing vessels.

The object of the Panel as defined at its first session, July 13-17, 1964, in London is "to collect and study data, instigate further research, and disseminate information and recommendations on the stability of fishing vessels of different types and dimensions, with the ultimate object of establishing criteria for judgement of stability, and to insure that the master is furnished with adequate and understandable information for his guidance."

The first session of the Panel of Experts was attended by representatives of Denmark, West Germany, Finland, France, Iceland, Italy, Japan, Netherlands, Norway, Poland, Sweden, U.S.S.R., United Kingdom, United States, and by a representative of the Food and Agriculture Organization (FAO) of the United Nations.

The Panel agreed upon the following terms of reference:

1. To classify fishing vessels without limitation of size in different groups with regard to dimensions, type, fishing methods, and operating areas for the purpose of the studies to be carried out by the Panel.

2. To study and analyze casualty records of fishing vessels from different groups which have foundered or suffered dangerous heeling.

3. To collect, analyze, and compare existing national stability requirements, recommendations, and criteria for fishing vessels together with supporting information about the principles involved.

4. To compile on a uniform basis intact stability calculations (with curves) for different groups of fishing vessels, using parameters already established by the Working Group on Intact Stability of Ships, and using actual conditions of loading as practiced in specific fisheries.

5. To formulate recommendations with regard to stability criteria to be used for fishing vessels of the different groups.

6. To investigate the possibility of establishing simple methods to be used in judging the stability of small fishing vessels.

7. To investigate the desirability of establishing minimum freeboard requirements for fishing vessels.

8. To formulate recommendations with regard to watertight integrity and constructional details of fishing vessels which affect stability such as hatches, superstructures, binboards, freeing ports, safety releases, etc.

9. To investigate the possibility of standardizing assumptions with regard to wind and wave forces applicable to fishing vessels and to cooperate with the Working Group on Intact Stability of Ships in the research necessary to verify those assumptions.

10. To develop proposals for appropriate simple operating guidance to fishing crews regarding stability, avoiding as far as possible the necessity of making calculations at sea.

11. To collect information on present theoretical investigations and research work regarding the stability of fishing vessels and their general behavior at sea insofar as this affects stability.

12. To establish a long-range research program on the stability of fishing vessels and their general behavior at sea insofar as this affects stability.

13. To consider operational practices which have an unfavorable effect on the intact stability of fishing vessels and to recommend reasonable and practicable precautions which would prevent the reduction in stability or to keep it within acceptable limits.

At the London meeting, the Panel of Experts considered what work could be started immediately under those terms of reference. As a result, some members volunteered to carry out certain studies and report to the Panel at its next session. The Panel also prepared the following preliminary suggestions concerning fishing vessel stability:

1. All doorways and other openings through which water can enter into the hull or deck houses, forecastle, etc. should be suitably closed in adverse weather conditions, and accordingly all appliances for that purpose should be kept on board in good condition.

2. Hatchcovers and flush deck scuttles should be kept properly secured when not in use during fishing.

3. All porthole deadlights should be maintained in good condition and securely closed in bad weather.

4. All fishing gear and other large weights should be properly stowed and placed as low as possible.

5. Particular care should be taken when pull from fishing gear might have a bad effect on stability--for example, when nets are hauled by powerblock or when a trawl net snags on the bottom.

6. Gear for releasing the deck load in fishing vessels carrying their catch on deck should be kept in good working condition for use when necessary.

7. Freeing ports provided with closing appliances should always be capable of functioning and should not be locked, especially in bad weather.

8. When the main deck is prepared for a deck load by setting up pound boards, there should be slots of suitable size between the pound boards to allow easy flow of water to freeing ports in order to prevent the trapping of water.

9. Never carry fish in bulk without first being sure that the portable divisions in the holds are properly installed.

International (Contd.):

10. At any one time keep the number of partially filled tanks to a minimum.

11. Observe any instructions given regarding filling of water-ballast tanks, but always remember that slack tanks can be dangerous.

12. Any closing devices provided for vent pipes to fuel tanks should be secured in bad weather.

13. Reliance on automatic or fixed steering can be dangerous as it prevents quick maneuvers which may be needed in bad weather.

14. Be alert to all the dangers of following or quartering seas. If excessive heeling or yawing occurs, reduce speed as a first precaution.

15. In all conditions of loading, necessary care should be taken to maintain a seaworthy freeboard.

16. Pay special attention to icing of a vessel and reduce it by all possible means.

ORGANIZATION FOR ECONOMIC COOPERATION AND DEVELOPMENT

POSITION ADOPTED ON FISHING INDUSTRY SUBSIDIES:

The Fisheries Committee of the Organization for Economic Cooperation and Development (OECD) met in Paris, June 29-30, 1964, and considered a report on subsidies and other financial support to the fishing industries of member countries. The Fisheries Committee then issued recommendations making distinctions between justifiable subsidies and those which should be eliminated. The conclusions of the Fisheries Committee were endorsed by the Council of OECD in a statement to the press, July 21, 1964, the text of which follows:

"The Council of OECD recommends the Governments of member countries, when they determine their fishery policies, to take into consideration the conclusions of a study carried out by the Fisheries Committee on subsidies and other financial support to the fishing industries.

"The Report by the Fisheries Committee makes a distinction between subsidies which are likely to create difficulties at international level by creating or perpetuating abnormal conditions for the fishing industry, and those which 'may be necessary for developing the fishing industry and raising its productivity or for facilitating the alternative employment of fishermen.'

"These (subsidies which may be necessary) include government regulations for landing prices or sales and other nondiscriminatory systems drawn up and applied by the governments in order to fix or to regulate the prices. These systems involve no financial grant, however, other than the payment of the administrative costs or at least only a subsidy low enough to have no practical effect on the general level of prices.

"In the same way, social and economic motives may justify subsidies and other financial aids designed to encourage investment by small firms or individuals who have not the financial means needed to improve their equipment. These technical improvements, however, must result in profitable modernization likely to raise the fishermen's standard of living and insure them normal incomes.

"On the other hand, financial aids which favor home producers by reducing their costs of exploitation should be gradually diminished until their total abolition. Such aids have too great an influence on imports or exports.

"The Fisheries Committee also condemns catch premiums and subsidies given to fishermen on the basis of the quantity of fish landed, gross proceeds, or time spent at sea. Such schemes should only be introduced by way of exception and for a period not exceeding three years. In those countries where such subsidies have been made for more than 5 years, the aim should be to reduce them gradually with the object of abolishing them within 10 years.

"In the case of support given to traditional production which is diminishing but which gives rise to marketing difficulties, the possibilities of structural changes should be considered if the difficulties encountered by the sectors concerned tend to become permanent. The present aids, in so far as they facilitate the placing of exports, might well affect the international trade in fish and in this case the position on the international markets should be given careful attention.

"Care should also be taken not to encourage the tendency to overinvestment so as to avoid an artificial increase of the production capacity of the fleet in nonprofitable conditions of exploitation. To this effect, it is generally acknowledged that scrapping premiums, shipbuilding and other investment subsidies for the benefit of fisheries are only acceptable if they are to be in force for a period of less than 5 years and/or the amount granted does not exceed 25 percent of the building costs of a new vessel.

"Moreover the rate of interest for loans granted to the fishing industry must be comparable with the average rates of interest regarded as normal for private loans for similar purposes in the same country.

"Finally, financial aid given to shipbuilding has not been considered as a subsidy for the fishing industry so long as it does not reduce the costs of investment to the buyer of a vessel below the cost of purchasing a similar vessel from a foreign shipyard.

"These general recommendations are accompanied by country recommendations which take account of the structures of the different national fishing industries and the economic conditions which might influence the fishing situation." (Organization for Economic Cooperation and Development, Paris, July 21, 1964.)

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FISH PROMOTIONAL MATERIALS PLANNED:

Fish promotional materials in the form of colored illustrations of various fish species are planned to be issued by the German Fish Promotion Service (Deutsche Fischwerbung e.V.) as a cooperative fish promotion service under the Organization for Economic Cooperation and Development (OECD). The illustrations would be available to persons or agencies in OECD Member Countries who are interested in fish promotion services, and they are encouraged to participate in this cooperative effort.

The proposed illustrations are based on water colors and would be suitable for use in retail or wholesale fish establishments, for educational school material, or for display at fishery group meetings. They would measure about 17 x 23 inches consisting of 12 different fish species including herring, ocean perch, cod, haddock, mackerel, halibut, wolffish (ocean catfish), shrimp, tuna, and several other species. The names of the different fish

International (Contd.):

species could be shown in several languages. The price for the illustrations would vary according to the number of copies ordered and would range from about 10 to 15 U. S. cents each.

For further information, interested persons may write directly to: Deutsche Fischwerbung, 2 Karlsburg, 2850 Bremerhaven 1, West Germany, or through the Fisheries Division, Organization for Economic Cooperation and Development, 2 rue Andre-Pascal, Paris 16e, France.

Member Countries of the OECD include the United States, Canada, Japan, the European Common Market countries, member countries of the European Free Trade Association (EFTA), and others.

UNITED NATIONS

CONVENTION ON THE TERRITORIAL SEA AND THE CONTIGUOUS ZONE ENTERS INTO FORCE:

The Convention on the Territorial Sea and the Contiguous Zone (which was adopted by the United Nations Conference on the Law of the Sea in April 1958 at Geneva) entered into force September 10, 1964, following ratification by 22 countries. The Dominican Republic deposited the 22nd ratification August 11, 1964. The United States ratified the Convention on April 12, 1961. The Convention embodies the results of work of the 1958 United Nations conference, but does not cover the width of the territorial sea. Among other things, the Convention establishes specific rules for the right of innocent passage of ships through territorial waters, with separate reference to merchant vessels, government-owned ships used commercially, and warships. The Convention describes the rights and duties of states through whose waters the ships pass.

It also provides for the use of the low-water line as the baseline for measuring the breadth of the territorial sea, except as otherwise provided for in the Convention. The exception allows for the use of the straight baseline method (Article 4) in localities where the coast is deeply indented or if there is a fringe of islands immediately adjacent to the coast.

The Convention also recognizes the right of a coastal state to exercise jurisdiction over a "contiguous zone" extending up to 12 miles from the baselines from which the territorial sea is measured, for the purpose of allowing the coastal state to exercise control necessary to: "(a) prevent infringement of its customs, fiscal, immigration, or sanitary regulations within its territory or territorial sea; (b) punish infringement of the above regulations committed within its territory or territorial sea."

The 1958 United Nations Conference on the Law of the Sea also formulated the (1) Convention on the High Seas; (2) Convention on the Continental Shelf; and (3) Convention on Fishing and Conservation of the Living Resources of the High Seas. All of those Conventions have entered into force, except the Convention on Fishing and Conservation of the Living Resources of the High Seas which in August 1964 had only 16 of the 22 ratifications needed before coming into force.

Note: See Commercial Fisheries Review, June 1961 p. 90; May 1960 p. 40.

WHALING

ANTARCTIC WHALE OIL AND SPERM OIL PRODUCTION, 1962/63 AND 1963/64 SEASON:

Total marine oil production from pelagic whaling in the Antarctic during the 1963/64 season was down about 9 percent from that in the previous season due to a drop of 20 percent in whale oil output. All countries participating in Antarctic whaling during the 1963/64 season reported lower production except Norway. The decline in whale oil production was partly offset by a gain of 54 percent in sperm oil production. The Japanese and Soviet fleets accounted for most of the gain in sperm oil.

Marine Oil Production from Pelagic Whaling in the Antarctic, 1962/63 and 1963/64 1/

Country	Season	Whale Oil	Sperm Oil	Total
		(Barrels 2/)		
Norway	1963/64	202,215	50,273	252,488
	1962/63	183,345	42,620	225,965
Netherlands	1963/64	47,971	15,411	63,382
	1962/63	62,916	17,491	80,407
Japan	1963/64	561,035	120,093	681,128
	1962/63	666,335	61,959	728,294
U.S.S.R.	1963/64	214,438	167,715	382,153
	1962/63	312,517	94,299	406,816
United Kingdom	1963/64	-	-	-
	1962/63	67,260	13,100	80,360
World total	1963/64	1,025,659	353,492	1,379,151
	1962/63	1,292,373	229,469	1,521,842

1/Preliminary.
2/Six barrels equal one long ton.

A total of 16 factoryships participated in the 1963/64 Antarctic whaling season--1 less

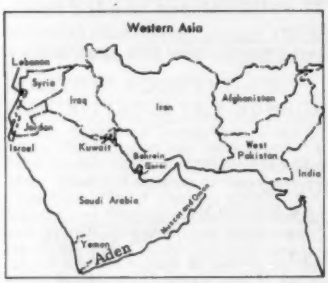
International (Contd.):

than in the previous season. After the 1962/63 season the British Antarctic whaling factory-ship was sold to Japan. (United States Embassy, Copenhagen, June 30, 1964.)

Aden

FISHERIES DEVELOPMENT PROJECT:

To help develop fisheries in the Gulf of Aden and adjacent waters, the United Nations Special Fund has contributed £330,000 (US$924,000) and the United Kingdom has contributed £160,000 ($448,000) for a fisheries survey and training project. The development project is expected to continue for 3 years and includes provisions for chartering 2 fishing vessels to be used in training local fishermen in the Aden area. The project is being carried out by the Food and Agriculture Organization of the United Nations. (Fish Trades Gazette, July 4, 1964.)



Note: See Commercial Fisheries Review, March 1964 p. 39.

Australia

SCALLOP CATCH ON NEW GROUNDS OFF VICTORIA:

During October 1963-February 1964, the Australian newly-developed Port Phillip Bay (Victoria) scallop beds yielded 35,800 bags of scallops (611,000 pounds of meats). Those scallops are being marketed in Melbourne and exported (France being the best customer).

In past years Tasmania has been Australia's main source of scallops with production reaching a record 1,257,076 pounds (worth A£160,000 or US$358,400 ex-vessel) in 1962. Production dropped to 978,864 pounds in 1963, when the main season was four months.

A meeting of licensed scallop and snapper long-line fishermen in Melbourne agreed to restrictions being placed on scallop dredging operations in certain areas of Port Phillip Bay during April, May, and September. The only areas in which scallop fishing will be allowed during those months are south of an imaginary line from Indented Head to Snapper Point, near Mornington, and north of a line from Point Cook to Green Point, near Brighton. Long-line fishermen who operate gear within the areas set aside for scallop dredging will do so at their own risk. The meeting was called by the Victorian Fisheries and Wildlife Department to find an acceptable solution to the possible conflict which might have developed had the two fisheries both operated on the same grounds at the same time.

The snapper long-line season opens on April 1 and is an established fishery of long standing. The most productive months of that fishery are during April, May and September. The snapper long-line season closes at midnight on September 30.

The scallop fishery is in its first year, having begun in September 1963. Previously no restrictions have applied to the scallop fishery in Victoria. (Australian Fisheries Newsletter, May 1964.)

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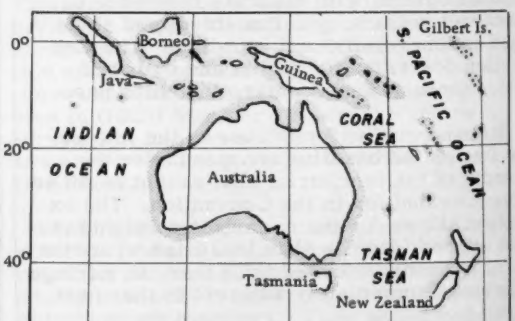
NEW SCALLOP BED SHOWS PROMISE:

East coast beds proved most productive in the opening weeks of the Tasmanian scallop season in May 1964. A new bed south of St. Helens showed most promise. Indications late in May were that the bed was more extensive than previously thought, and would attract more vessels.



About 60 vessels were expected to be dredging east coast and D'Entrecasteaux beds when

Australia (Contd.):

the season reached its peak. This is about 40 fewer vessels than last season.

The Sea Fisheries Division of the Tasmanian Department of Agriculture reported that rough weather marred the opening of the season in the D'Entrecasteaux Channel on May 14, and only 8 vessels put to sea. Thirty-three vessels worked beds on the east coast.

Best scallop catches were in the St. Helens area where 30 to 40 bags a boat were landed. This improved to 100 bags a day for some boats in the second week of the season.

Largest and best-conditioned scallops were taken from beds off Triabunna, also on the east coast. Yields were as high as 25 to 30 pounds of meats for a bean bag containing between 550 and 700 shell scallops.

The early-season ex-vessel price for scallops was 2s.9d. (31 U.S. cents) a pound, out of which they paid 8d. (7 cents) a pound for splitting and cleaning. In April scallops were selling for 4s.4d.(48.5 cents) a pound in Hobart. Most of the early season catch was sold on the local market, and top-quality scallops were packed for export.

Tagging of 10,000 Port Phillip Bay scallops to obtain information about their growth rate, population density, mortality, and migration is planned by the Victorian Department of Fisheries and Wildlife.

Divers intend to tag in scallop beds in the Dromana, Sorrento, Portarlington, Corio Bay, Point Cook, and Mordialloc areas and a reward will be paid for returned tagged scallop shells. (Australian Fisheries Newsletter, June 1964.)

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FISHERY EXPORTS INCREASE:

Australia is rapidly becoming one of the world's leading exporters of high-priced seafoods, and for the financial year ending June 30, 1964, it was anticipated that exports of marine products would reach A£10 million (US$22.4 million).

For the nine months ending March 1964, exports of marine products were valued at almost £6 million ($13.4 million) compared with slightly more than £4.5 million ($10.1 million) for the same period in 1962/63. Exports of marine products for the full year 1962/63 were almost £8 million ($17.9 million).

For 1963/64 exports of spiny lobsters (both tails and whole cooked) were expected to reach £7 million ($15.7 million) while shrimp exports were expected to approach £1 million ($2.2 million), according to the Economic Section of the Fisheries Branch of the Department of Primary Industry.

Interesting developments have been increased exports of molluscs, mainly scallops and abalone, which could amount to £150,000 ($336,000) for 1963/64, and the export of about 2,000 short tons of tuna. The items making up the balance of marine exports were pearls, pearl shell, whale products, and a small quantity of canned fish.

United States, France, and Japan are the three main markets for marine products. Exports to the United States for 1963/64 were expected to be about £6.3 million ($14.1 million), consisting of approximately £6 million ($13.4 million) of spiny lobsters, and the balance mainly tuna and shrimp. Spiny lobster exports towards the end of 1963/64 were up about 9 percent from last year. Since there was a recovery in spiny lobster prices on the United States market, the actual value of the exports could exceed the estimate.

Marine exports are now the third largest export trade item to France behind wool and hides. It is thought that for 1963/64 those exports will be worth about £900,000 ($2.0 million), consisting almost entirely of whole spiny lobsters (approximately £750,000 or $1.7 million) and scallops.

Japan is Australia's main market for shrimp and exports for 1963/64 should reach almost £500,000 ($1.1 million). Pearls, and to a lesser extent pearl shell, are also sold to Japan in large quantities. (Australian Fisheries Newsletter, June 1964.)

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NEW SOUTH WALES PLANS CHAIN OF SAFE FISHING PORTS:

To link the whole of Australia's New South Wales coastline with a chain of safe fishing ports is the ultimate aim of that State's Government. The plan also is regarded as a step

Australia (Contd.):

towards decentralization of the fishing industry, by providing facilities for its expansion, and paving the way for the development of processing plants and the creation of local employment.

The wholesale value of the commercial fish catch in New South Wales averages between A£3.0 million and £4.0 million (US$6.7 million and $9.0 million) a year, and the annual catch between 25 million and 30 million pounds of fish.

To date expenditure of more than £1.3 million ($2.9 million) has been approved on improvements to 7 fishing ports. Port works already have been completed at Bermagui, Brunswick Heads, Evans Head, and Ulladulla; work is in progress at Tweed Heads and Crowdy Head, while the building of a breakwater at Eden has been authorized.

In a number of coastal ports in the past, fishing vessels have been restricted in their operations by difficult entrance conditions and insufficient depth of water. In some cases vessels have only been able to leave port or return at high tide, and even then some times under dangerous conditions.

The State Government's plan aims to overcome those difficulties by constructing breakwaters, walls, and other associated harbor works so as to give safe entry at all stages of the tide.

The New South Wales Government also is engaged in an improvement scheme for major ports, such as Newcastle, Port Kembla, and the Clarence River mouth.

Announcing improvements to the fishing port of Eden, the New South Wales Minister for Public Works said that the greatly increased safety provided by the breakwater would encourage larger boats to operate from the port to exploit fishing grounds off the coast. "It would allow the fleet of 40 vessels to operate on a more efficient basis," he said.

Eden is one of the major New South Wales fishing ports with an annual catch worth more than £500,000 ($1.1 million). With the development of the tuna fishery based in that port, the catch is likely to increase in value. (Australian Fisheries Newsletter, May 1964.)

Brazil

WHALING OPERATIONS OFF BRAZIL:

The Japanese whaling vessel Daishin Maru No. 1 is reported to be making good whale catches in the Atlantic Ocean off the Brazilian coast. The vessel, which commenced operations from a base in Brazil on June 18, 1964, is reported to have caught a total of 100 sei whales as of July 27, 1964.

The Brazilian-based whaling enterprise of another Japanese fisheries company is not conducting any whaling operations this year. (Suisan Tsushin, July 31, 1964.

Canada

EXTENDED FISHING LIMITS DO NOT APPLY TO UNITED STATES FISHING VESSELS:

In July 1964, Canada proclaimed fishing limits of 12 miles as described in the Territorial Sea and Fishing Zones Act of Canada. However, the extended limits will not apply to United States fishing vessels on either the Pacific or Atlantic Coast. This means United States fishing vessels may continue to fish up to the previously established 3-mile limit of Canadian territorial waters.

Canada will also permit fishing vessels of France, Britain, Portugal, Spain, Italy, Norway, and Denmark to continue to fish in the 3-12 mile zone off Canada on the Atlantic Coast.

The exemptions for the fishing vessels of the United States and the seven European countries were established by the Canadian Government through an order in Council, the text of which follows:

"Whereas negotiations have been under way with the Governments of the United States of America, France, Britain, Portugal, Spain, Italy, Norway, and Denmark respecting fishing off Canada's coast;

Canada (Contd.):

"And whereas the proclamation of the Territorial Sea and Fishing Zones Act will extend to areas now fished by these countries the laws of Canada respecting fishing which apply to the territorial sea of Canada;

"And whereas at the present stage of negotiations, and in order to facilitate their completion, it is expedient not to extend the application of the laws of Canada respecting fishing to areas fished by the aforementioned countries.

"Therefore, His Excellency the Governor General in Council, on the recommendation of the Minister of Fisheries, pursuant to section 4 of the Coastal Fisheries Protection Act, is pleased hereby to amend the Coastal Fisheries Protection Regulations in accordance with the Schedule hereto, effective on the day fixed by proclamation of the Governor in Council as the day on which an Act respecting the Territorial Sea and Fishing Zones of Canada, Chapter 22 of the Statutes of Canada, 1964, shall come into force.

"1. The Coastal Fisheries Protection Regulations are amended by adding thereto the following section:

'9. (1) Fishing vessels of United States of America are authorized to continue to fish in the fishing zones established by section 4 of the Territorial Sea and Fishing Zones Act.

(2) Fishing vessels of France, Britain, Portugal, Spain, Italy, Norway and Denmark are authorized to continue to fish in the fishing zones on the Atlantic Coast of Canada established by section 4 of the Territorial Sea and Fishing Zones Act.'

"2. The said Regulations are further amended by deleting the words 'Canadian territorial waters' in sections 4, 5, and 6 and by substituting therefor the words 'Canadian fisheries waters'."

Chile

FISH MEAL INDUSTRY TRENDS, SECOND QUARTER 1964:

All fish meal plants in northern Chile were reported to be operating in mid-1964, although the supply of anchoveta was somewhat irregular. There have been sharp fluctuations this year in landings of anchoveta, the commercial fish of the Chilean reduction industry. Anchoveta virtually disappeared off the coast of Chile in March and did not return until mid-April. (The Chilean anchoveta fleet has a limited range since the vessels must be able to deliver their catch to the fish meal plants within a day, or carry ice which is not feasible.)

Some 20 to 25 fish meal plants were operating in northern Chile in mid-1964 as the industry continued to expand. The largest plant in Chile is the new facility at Arica which has a raw material capacity of 70 tons per hour. The new plant's capacity will be expanded to 120 tons by September 1964.

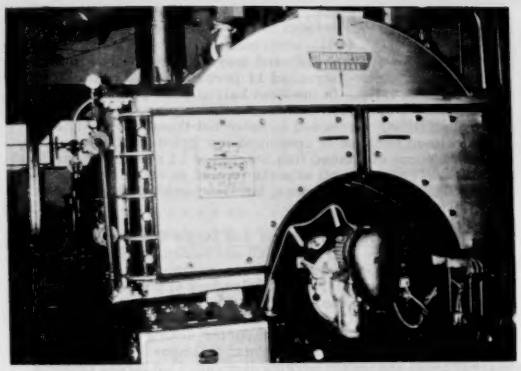

Fig. 1 - Boiler plant of a fish meal plant in San Antonio, Chile.

Fig. 2 - Bagging fish meal at a plant in San Antonio, Chile.

The Chilean fish meal industry is supported by a purse-seine fleet numbering close to 200 vessels. The fleet consists mainly of modern steel vessels of 100 to 170 tons, equipped with echo-sounders, radio communication, and power equipment for handling nets. The Iquique shipyard (which began operating in 1961) laid the keel for its 100th vessel in June 1964. (United States Embassy, Santiago, July 24, 1964.)

Denmark

FISHERY PRODUCTS EXPORTS, JANUARY-JUNE 1964:

Exports to All Countries: Denmark's total exports of fishery products and byproducts to all countries in the first half of 1964 increased 10 percent in value over the same period in 1963, despite a 3-percent decline in quantity and a 5-percent drop in landings during the first 6 months of the year.

Denmark (Contd.):

Danish exports of fresh fish and frozen fish--the two most important categories--increased 11 percent and 22 percent, respectively, in value. In the first half of 1964 prices were slightly better for fresh and frozen fishery products. Exports of herring fillets increased in value but those of round herring declined because of continued low prices in Germany. Danish exports of canned fish increased 13 percent in the first half of 1964, and fish oil exports tripled in value reflecting relatively high fish oil prices, but Denmark's fish meal exports dropped 10 percent.

Exports to Economic Groups and Major Countries: The European Common Market (EEC) accounted for 43 percent of the value of Danish fishery exports, and the European Free Trade Association (EFTA) countries took 41 percent. However, the EFTA increased its imports from Denmark by 24 percent while the EEC gained only 14 percent. Germany continued as the largest individual importer, taking 27 percent of Denmark's fishery exports. Germany's imports from Denmark of fresh and frozen herring decreased but larger imports of herring fillets, other marine fish, and pond trout added up to a total increase of 16 percent. The United Kingdom increased its imports by 32 percent, almost doubling the value of frozen fish fillets imported and also receiving greater direct landings by Danish fishing craft. Sweden and Italy increased their imports from Denmark about one-third but the United States imports dropped by 30 percent.

Exports to the United States: Exports of Danish fishery products to the United States declined 42 percent in quantity and 30 percent in value during the first half of 1964 as compared with the same period in 1963. A 52-percent drop in the value of United States imports of Danish cod fillets (blocks) is ascribed to competition from lower-priced Canadian fishery products in the United States market and a substantially greater demand by buyers in the United Kingdom. Denmark's inability to meet the United States market prices of Japanese trout was responsible for a 46 percent decrease in pond trout imports. Canned herring imports from Denmark were down 12 percent. However, Norway lobster imports from Denmark more than doubled and imports of Danish flatfish more than tripled.

Table 1 - Danish Fishery Products Exports to all Countries, January-June 1964 and Year 1963

Product	January-June 1964			January-Dec. 1963 1/		
	Qty.	Value		Qty.	Value	
	Metric Tons	1,000 Kr.	US$ 1,000	Metric Tons	1,000 Kr.	US$ 1,000
Fresh, Frozen, & Cured:						
Fresh fish	94,231	162,368	23,543	200,519	314,100	45,545
Frozen "	24,641	84,340	12,229	46,538	152,097	22,054
Salted "	1,683	6,319	916	9,945	26,881	3,898
Smoked "	297	4,414	640	517	7,322	1,062
Canned Products:						
Fish	2,918	10,825	1,570	5,507	20,474	2,969
Shellfish	609	4,565	662	1,952	12,738	1,847
Semipreserved Products:						
Fish	695	4,158	603	1,663	9,291	1,347
Shellfish	434	2,562	372	168	2,625	380
Other Products:						
Fish meal, solubles, ensilage, and trout food	29,064	25,739	3,732	72,507	65,372	9,478
Total	154,572	305,290	44,267	339,316	610,900	88,580
	January-May 1964					
Fish oil 2/. . . .	11,015	12,994	1,877	20,754	18,607	2,698

1/Record year for quantity and value.
2/Fish oil data are shown separately because they are collected by another Ministry and often are delayed.
Note: One Danish krone equals US$0.145.
Source: Preliminary data from Ministry of Fisheries.

Table 2 - Value of Danish Fishery Products Exports by Economic and Major Countries, January-June 1964

Destination	January-June 1964 1/		January-Dec. 1963	
	Value 1,000 Kr.	US$ 1,000	Value 1,000 Kr.	US$ 1,000
By Economic Groups:				
Common Market (EEC).	131,000	18,995	260,000	37,700
European Free Trade Assn. (EFTA-including Finland)	126,000	18,270	225,000	32,625
East Bloc countries	12,000	1,740	30,000	4,350
Other countries	36,000	5,220	114,500	16,603
Total	305,000	44,225	629,500	91,278
Major Importers by Country:				
West Germany	81,000	11,745	159,000	23,055
United Kingdom	58,000	8,410	109,000	15,805
Sweden	40,000	5,800	59,000	8,555
Italy	22,000	3,190	39,000	5,655
Switzerland	20,000	2,900	36,000	5,220
United States	14,000	2,030	46,500	6,743

1/Preliminary.

Table 3 - Danish Fishery Products Exports to the United States, January-June 1964

Product	January-June 1964			January-Dec. 1963		
	Qty. 1/	Value		Qty.	Value	
	Metric Tons	1,000 Kr.	US$ 1,000	Metric Tons	1,000 Kr.	US$ 1,000
Fresh & Frozen:						
Fillets:						
Cod	1,811	5,702	827	8,934	27,919	4,048
Other fillets	85	370	54	769	1,283	186
Pond Trout	226	1,784	259	784	6,103	885
Flatfish 2/	164	1,414	205	130	726	105
Norway lobster	107	2,020	293	212	4,368	634
Other	1	75	10	13	141	20
Cured Products:						
Salted & Smoked 3/	21	77	11	105	207	30
Canned Products:						
Herring & sprat	269	1,282	186	556	2,977	432
Shrimp	67	664	96	175	1,654	240
Mussels	31	177	26	57	350	51
Other	10	58	8	40	227	32
Semipreserved products	8	95	14	20	240	35
Fish solubles	100	96	14	400	344	50
Total exports to U.S.	2,900	13,814	2,003	12,195	46,539	6,748

1/Preliminary.
2/Mostly turbot, brill, plaice, and sole.
3/Mostly cod, salmon, eels.

Future production of Jutland cod fillets are expected to be less available to United States buyers than those from Bornholm, the Faroe Islands, and Greenland, because of the demand for local processing into consumer and institutional packs of breaded fillets, sticks and portions.

A larger production of pond trout (possibly 10 to 20 percent) is expected this fall and next year. The increase is a result of a greater survival of fingerlings due to lower loss from disease, resulting from raising the fingerlings in concrete rather than earthen ponds, and the use of dry food instead of wet food. (Regional Fisheries Attache for Europe, United States Embassy, Copenhagen, July 29, 1964.)

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Denmark (Contd.):

FISHERIES TRENDS:

January-June 1964: LANDINGS: In the first half of 1964, landings in Danish ports by Danish vessels were down 12 percent from those in the same period of 1963 due mainly to a substantial decline in the catch of industrial fish. The Norway pout fishery has been a failure, and sand eel landings for the reduction industry were down about 25 percent. The decline was partly offset by heavier local landings by Danish vessels of flatfish, herring, and brisling. In addition, foreign vessels (mainly Swedish) increased their landings (mostly herring) in Danish ports. Danish vessels also increased their landings in foreign ports, which consist mainly of cod and plaice deliveries to England.

Table 1 - Danish Fishery Landings, January-June 1964 with Comparisons

Item	Jan-June 1964	Change from Jan.-June 1963	
	Quantity	Plus	Minus
	Metric Tons	(Percent)	
Landings in Danish Ports:			
By Danish vessels:			
Flatfish[1]	32,257	11	-
Cod	42,258	1	-
Cod-like fish[2]	17,665	-	49
Herring	117,547	37	-
Brisling	4,071	45	-
Mackerel	2,958	-	22
Eels	546	-	20
Salmon	558	-	71
Pond trout	4,236	15	-
Other fish[3]	109,110	-	39
Norway lobster	1,015	114	-
Shrimp	2,050	-	28
Mussel	7,965	49	-
Other shellfish	22	-	46
Starfish	2,206	222	-
Total by Danish vessels in Danish ports	344,464	-	12
By foreign vessels in Danish ports	88,513	35	-
Total landings in Danish ports	432,977	-	5
Landings in Foreign Ports: By Danish vessels	2,831	95	-

1/Plaice, flounder, dab, common sole, etc.
2/Haddock, coalfish, hake, ling, etc.
3/Mostly industrial fish such as sand eels, Norway pout, etc.

PROCESSING: Danish production of processed fishery products in January-June 1964 included substantial quantities of cod fillets, herring fillets, plaice fillets, and canned herring. Comparative production data for 1963 are not available, but export summaries indicate that more fish have been frozen, smoked, and canned in Denmark in the first half of 1964 than in the same period of 1963.

Table 2 - Danish Production of Processed Fishery Products, January-June, 1964

Product	Jan.-June 1964 Quantity
	Metric Tons
Canned:	
Herring & sprats	1,901
Mackerel	325
Other fish	3,011
Mussels	258
Other shellfish	582
Semi-preserved:	
Herring & sprats	2,246
Other fish	224
Mussels	318
Fresh & Frozen Fillets:	
Cod	14,138
Cod-like fish[1]	758
Plaice	7,152
Other flatfish	486
Herring	16,603
Other fish	132
Smoked:	
Herring & sprats	822
Mackerel	662
Eels	341
Salmon & trout	222
Other fish and shellfish	121
Miscellaneous:	
Force meat[2]	772
Salted herring	11
Dry-salted cod	394
Other fishery products[3]	3,790
Industrial Products:	
Meal	39,582
Oil	10,555
Ensilage[4]	3,018
Solubles	4,905

1/Haddock, coalfish, hake, ling, etc.
2/Groundfish, milk, and flour.
3/Excluding industrial products.
4/Chemically treated raw fish.

July-August 1964 (Preliminary): Danish landings in July 1964 were substantial, but ex-vessel prices showed some decline. Despite a good export market, Danish processing plants were unable to handle the increased supplies because most of their workers began vacations in July.

One of Denmark's largest processing plants opened an affiliated plant in West Germany in August 1964 in order to avoid European Economic Community (EEC) tariffs on fishery products sold in the EEC countries. Initially, production at the new plant will consist of semipreserved fishery products but eventually all types of processed fishery products will be produced at the new West German facility. The greater part of the raw material for the plant will be obtained at Danish fishing ports. (Regional Fisheries Attache for Western Europe, United States Embassy, Copenhagen, August 12, 1964.)

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Denmark (Contd.):

FREEZERSHIP-TRAWLERS BUILT FOR SOVIET UNION:

The M/S Geizer, the final vessel in another series of four freezership-trawlers ordered by V/O Sudoimport, Moscow, from a Danish shipyard in Copenhagen, was christened on August 5, 1964. It will be the 28th freezer vessel delivered to the Soviet Union by the Copenhagen shipyard since 1932. The specifications and other particulars of the Geizer (91 meters long, 2,550 deadweight tons, and accommodations for a crew of 106) are similar to those of the Grumant, Golfstrim, and Skazachnik Andersen launched earlier in 1964.

Shows the partially completed M/S Geizer in construction drydock at a Copenhagen shipyard.

In September 1963, the Danish shipyard completed Soviet delivery of a previous series of four freezership-trawlers. Four more are to be delivered in 1965. Four additional vessels for delivery by the end of 1966 were ordered from Copenhagen by the Soviets in June 1964 at a cost of about Kr.25 million (US$3.6 million) each.

Some of the new Soviet freezerships operate out of Murmansk and Vladivostok off the Siberian north coast and in the northern part of the Pacific Ocean, according to Danish newspaper reports. They serve as motherships for trawlers catching cod, flatfish, and ocean perch, acting as a link in the freezer chain which ends in the Soviet retail outlets. On the freezership, which also may act as a stern trawler, the catch is mechanically headed and gutted, before being packed in blocks for freezing. Mechanization has made it possible to freeze 50 metric tons of blocks per day with 4 men. The new freezerships also carry a fish meal plant with a daily capacity of 30 tons of raw material. Cod livers are rendered into cod-liver oil in a separate plant. The frozen fish are either taken to receiving ports by the freezerships or delivered at sea to transport vessels. (Regional Fisheries Attache for Europe, United States Embassy, Copenhagen, August 12, 1964.)

* * * * *

TESTS INDICATE ARTIFICIAL "SEAWEED" MAY HELP PROTECT SHORELINE:

A Danish firm has developed an artificial "seaweed" and conducted an experiment with the material in an attempt to control currents and waves, thereby protecting the shoreline. The results of that experiment attracted the interest of the Danish Maritime Board which has scheduled further tests with the artificial "seaweed."

The objective of the experiments is to retard bottom currents by the use of an artificial obstacle. The artificial "seaweed," used as the obstacle, consists of polyesterene strings which are tied together and weighted at one end. That permits the other end of the string to wave and float about in the currents, thus retarding the flow. The polyesterene string has a density of about 0.9 which gives it a tendency to float. The first experiment with the artificial "seaweed" by the manufacturing company resulted in the deposit of almost 3,000 tons of sand over a period of 12 weeks in a 1,600-square-meter area along the western coast of Jutland.

Plans called for a test by the Danish Maritime Board to begin in late July 1964 off the western coast of Jutland in an area where the Atlantic surf has been washing away the coastal area. The Maritime Board test was to take place between two concrete jetties extending

Denmark (Contd.):

into the Atlantic Ocean. The purpose of the test is to protect the shoreline by building up up sand deposits near the end of the jetties which are about 300 meters apart. Between the jetties, 10 lines of rope were to be laid about 1½ meters apart. The ropes were to be weighted and the polyesterene artificial "seaweed" was to be tied to the ropes. In the new tests, the polyesterene strings used have more resemblance to a flat ribbon than those used in the first test by the manufacturing company. It was expected that the flat ribbon design would set up more resistance to the flow along the ocean bottom.

The artificial polyesterne "seaweed" has been patented by the Danish manufacturing company which has signed agreements giving a United States oil firm an option on the patent. (United States Embassy, Copenhagen, June 24, 1964.)

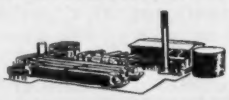
Fiji Islands

JOINT JAPANESE-BRITISH TUNA BASE IN FIJI ISLANDS COMPLETED:

The joint British-Japanese tuna base at Levuka, Fiji Islands, opened in early August 1964. The base is beginning operations with 17 fishing vessels, but plans to eventually increase that fleet to 26 vessels.

Shore facilities include a 2,000-ton cold-storage warehouse, a 60-ton freezing unit, a 30-ton ice-making plant, and a 600-ton ice-storage facility. Annual landings of 9,650 metric tons at the new base have been forecast, of which 6,750 tons are expected to be exported and 2,900 tons shipped back to Japan. The base has a frozen tuna export quota of 9,000 short tons. (Suisancho Nippo, August 6, 1964, and other sources.)

Note: See Commercial Fisheries Review, July 1964 p. 59, March 1964 p. 53.



Ghana

TECHNICAL FISHERY SERVICE AGREEMENT MADE WITH JAPAN:

Ghana, which in February 1964 contracted to purchase ten 1,850-ton trawlers and two 1,850-ton carrier vessels from a Japanese fishing firm, in July 1964 made arrangements to receive technical fishery service from the Japanese firm for the operation of those vessels. The agreement was to be formalized when the Ghanaian Minister of Commerce and the president of the Ghanaian Fisheries Corporation visited Japan in early August. About 50 Japanese crews, including the captain and the engineer, were to board the first fishing vessel to be delivered to Ghana in August this year. The second vessel is scheduled for completion by the end of this year, the third, in in June 1965, with final completion of all vessels scheduled for 1967.

Under an ambitious program to expand her fishing fleet, Ghana is also reported to have ordered a large number of fishing vessels from other countries. They include six 1,800-ton trawlers ordered from Norway, two 500-ton trawlers from Great Britain, and 18 trawlers (ten 60-ton two-boat trawlers and eight 200-ton trawlers) from the Soviet Union. Prior to this, Ghana purchased three 1,000-ton side trawlers from the Soviet Union and two stern trawlers from Great Britain, all of which are already in service. Under technical service agreements concluded with those two countries, 15 Russian crews are aboard the vessels built by the Soviet Union and 3 British nationals are serving aboard the British-built trawlers. (Suisancho Nippo, July 29, 1964.)

Greenland

FAROESE FISHING RIGHTS IN GREENLAND WATERS TO BE RENEGOTIATED:

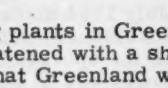
Faroese fishing rights in Greenland waters will be considerably reduced in 1967 unless a fishing rights agreement concluded in 1959 is renewed. In the summer of 1964, plans were announced for negotiations between the 2 countries to determine the future of the agreement.

Greenland had expected the present agreement to lead to close cooperation with Faroese fishing interests, thereby providing a supply of raw material for the developing fish-processing industry in Greenland. It was also hoped that the Faroese would train Greenland fishermen in the use of modern fishing methods. It seems, however, that those expectations have not been completely fulfilled.

It is claimed that £5 million (US$14 million) has been invested in the development of

Greenland (Contd.):

fish-processing plants in Greenland. Those plants are threatened with a shortage of fish. It is expected that Greenland will insist on a much larger supply of fish from Faroese fishing vessels if the present fishing agreement between the two countries is extended beyond 1967. (The Fishing News, June 26, 1964.)



Guatemala

SHRIMP FISHING
INVESTMENT OPPORTUNITY:

The U. S. Trade and Industrial Development Mission to Central America and Panama has described the following shrimp fishing investment opportunity in Guatemala:

A family-owned shrimp fishing enterprise, wishing to expand operations, is seeking a joint venture with United States fishing interests. The Guatemalan firm holds one of the limited number of shrimp fishing licenses issued by the Guatemalan Government. The firm wants to purchase additional vessels and build a wharf on land which it holds under long-term lease. An investment of about US$300,000 would be required. The current net worth of the company is declared to be $78,800. The firm's volume of business is reported to average around $280,000 a year. In 1962, the company produced 247,000 pounds of shrimp, 88,000 pounds of fish, and 9,000 pounds of other fishery products.

For additional details write: Guillermo Matheu Bacohar, 7a Calle 9-21, Zona 1, Guatemala City, Guatemala. Correspondence should include the reference: IR 2. (International Commerce, August 17, 1964, U. S. Department of Commerce.)

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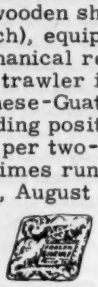
JOINT JAPANESE-GUATEMALAN
SHRIMP OPERATIONS:

The joint Japanese-Guatemalan shrimp enterprise established at Champerico, Guatemala, is annually producing 1,000 metric tons of frozen shrimp. Most of the production is exported to the United States, principally to New York and Los Angeles, and a small portion is sold on the domestic market. Small shrimp are also exported to Japan. The joint shrimp base, which is operating at full capacity, is said to be unable to increase production beyond the present level because of the limited capabilities of its shrimp fishing fleet.

A fleet of 30 wooden shrimp trawlers (52-72 gross tons each), equipped with high-speed engines and mechanical refrigeration, are in operation. Each trawler is jointly manned by a five-man Japanese-Guatemalan crew, with the Japanese holding positions of captain and engineer. Catch per two-week trip averages 2-3 tons, but at times runs as high as 5 tons. (Suisancho Nippo, August 14, 1964.)



Iceland

SALMON FARM
INVESTMENT OPPORTUNITY:

An Icelandic firm has been carrying out scientific experiments in the development of a unique crossbreed of salmon (Salmo trutta islandia). The firm is now seeking additional capital to develop commercial salmon farms. The firm, which is presently capitalized at $35,000, plans a number of relatively small installations, rather than one large fish-rearing center, both for the accessibility of fresh water and to minimize the danger of disease in the fish. It is estimated that in about 2 years the first section of the planned installation would produce 100 tons of salmon a year, with total production gradually increasing to around 1,500 tons a year.

It is anticipated that the new breed of salmon will enjoy a good demand from institutional users in the United States and European luxury resort areas. United States firms interested in participating in the development of the salmon farms on a joint venture basis with the Icelandic firm may obtain additional information by writing to the Bureau of International Commerce, Office of International Investment, File 5-0989-1-S, U. S. Department of Commerce, Washington, D. C. 20230.

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FISHERY LANDINGS BY PRINCIPAL SPECIES, JANUARY-MARCH 1964:

Species	January-March	
	1964	1963
	(Metric Tons)	
Cod	88,607	71,530
Haddock	17,828	16,590
Saithe	8,330	3,166

(Table continued on next page.)

Iceland (Contd.):

Species	January-March	
	1964	1963
	. . . (Metric Tons) . . .	
Ling	2,249	2,784
Wolffish (catfish)	3,360	6,329
Cusk	2,346	3,535
Ocean perch	3,507	3,987
Halibut	240	284
Herring	64,366	62,420
Shrimp	45	291
Capelin	8,640	-
Other	1,133	1,305
Total	200,651	172,221

Note: Except for herring which are landed round, all fish are drawn weight.

* * * * *

UTILIZATION OF FISHERY LANDINGS, JANUARY-MARCH 1964:

How Utilized	January-March	
	1964	1963
	. . . . (Metric Tons)	
Herring[1/] for:		
Oil and meal	51,707	43,812
Freezing	9,428	9,059
Salting	3,231	4,646
Fresh on ice	-	4,904
Groundfish[2/] for:		
Fresh on ice	11,744	11,417
Freezing and filleting	54,793	52,401
Salting	31,193	20,982
Stockfish (dried unsalted)	25,594	20,165
Canning	24	-
Home consumption	3,231	3,767
Oil and meal	1,021	778
Capelin for:		
Freezing	133	-
Oil and meal	8,507	-
Shrimp for:		
Freezing	20	267
Canning	25	23
Total production	200,651	172,221

1/Whole fish.
2/Drawn fish.
Source: Aegir, June 15, 1964.

India

JOINT JAPANESE-INDIAN FISHING FIRM CONCENTRATES ON SHRIMP:

A joint fishing venture established in India almost 10 years ago by a large Japanese fishing company and an Indian firm is reported to be directing its main effort to shrimp fishing. Initially, the base commenced operations as a trawling base for bottomfish such as red snapper, croaker, and Spanish mackerel, but several years ago it began to concentrate on shrimp fishing following the discovery of good shrimp grounds off Cochin.

Seven shrimp trawlers (from 15 to 75 gross tons) are operating out of that base. Production per vessel reportedly runs as high as 500 boxes (33 lbs. per box) per day. Large shrimp are mostly frozen and exported to the United States, Europe, and Japan. The joint firm is planning on adding 10 shrimp trawlers to its fishing fleet.

Trawl operations for bottomfish are being conducted with the company's two-boat trawler based at Bombay. The vessel is manned jointly by Japanese and Indian crewmen. (Nihon Suisan Shimbun, August 10, 1964.)

Italy

JAPANESE FROZEN TUNA SALES TO ITALY IMPROVING:

Japanese frozen tuna sales to Italy, which had sharply declined in the second quarter of 1964, were reported improving as of late July, with active offers being made by Italian packers. Tuna packing in Italy, which had been partly reduced or completely suspended due to the unfavorable foreign exchange situation in that country, was back in full swing at most of the plants as a result of large canned tuna orders placed by the Italian armed forces. Italian offers for Japanese tuna were being made at US$300 a metric ton for yellowfin and US$275 a metric ton for big-eyed, c.i.f. Italy. (Nihon Suisan Shimbun, July 24, 1964.)

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JOINT JAPANESE-ITALIAN TUNA VENTURE:

A Japanese fishing company in July 1964 was authorized by the Japanese Fisheries Agency to participate in a proposed joint tuna venture with an Italian firm. The Japanese firm is to contribute the equivalent of 30 million yen (US$83,333) of the total capital investment of 100 million liras (US$160,000) for the enterprise, which will be established in Italy. The venture includes the operation of a 1,500-ton two-portable boat-carrying tuna mothership, to be built in Italy. However, since the vessel construction has not yet been started, it appears likely that this venture will not go into full-scale operation until the summer of 1965.

The Japanese firm will conduct the fishing operations and the Italian partners will sell

Italy (Contd.):

the catches to Italian packers. Annual production of tuna is expected to total around 2,000 metric tons. (Suisancho Nippo, July 29, 1964.)

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MARINE OIL FOREIGN TRADE, 1962-1963:
Italy's foreign trade in marine oils in 1962 and 1963 consisted almost entirely of incoming shipments as exports were insignificant. Italian imports of marine oils (other than liver oils) in 1963 were down 16.5 percent from those in the previous year due mainly to a sharp drop in shipments from the Netherlands. Italian imports of marine liver oils in 1963 showed a modest gain from the previous year. (United States Embassy, Rome, April 13, 1964.)

Italy's Foreign Trade in Marine Oils, 1962-1963

Commodity and Country of Origin or Destination	Imports		Exports	
	1963	1962	1/1963	1962
	(Metric Tons)			
Marine Fats and Oils (other than liver oils):				
Finland	-	50	-	-
France	1,079	1,494	-	-
West Germany	116	105	-	-
Norway	4,432	4,441	-	-
Netherlands	626	2,298	-	-
Portugal	706	739	-	-
United Kingdom	255	183	-	-
Morocco	1,947	1,526	-	-
South Africa Republic	6	55	-	-
Canada	297	-	-	-
Peru	114	125	-	-
United States	163	-	-	-
Other countries	121	796	13	17
Total marine fats and oils (other than liver oils)	9,862	11,812	13	17
Marine Liver Oils:				
Finland	19	-	-	-
France	43	3	-	-
West Germany	58	26	-	-
Iceland	22	39	-	-
Norway	607	526	-	-
Portugal	491	618	-	-
United Kingdom	198	117	-	-
Other countries	40	36	1	2
Total marine liver oils	1,478	1,365	1	2

1/Export data for 1963 limited to January-October period.

Ivory Coast

PLANS FOR FISHERY DEVELOPMENT:
Developments and plans for expansion of the commercial fisheries of the Ivory Coast were outlined in a feature article titled "Important Expansion of Industrial Fishing Planned to Satisfy Growing Demand for Fish," published this past summer in Abidjan's local daily newspaper Matin. A translation of the article follows:

"As a result of technical development, traditional fishing is being replaced more and more by industrial fishing. This is a result of progress and wealth. A great change has taken place from the pirogues to fishing boats, who now go fishing with a maximum of safety. Without these new techniques, it would be impossible to venture to the offshore fishing banks, since fishing is more or less hazardous. Fish are seldom seen during the rainy season; the temperature is too low at the surface of the sea, pushing the fish to the deeper water.

"Fishing will become an important industry in the future. The Director of the Fishing Port released the following information about the development of industrial fishing in the Ivory Coast, the creation of an Ivoirien fishing fleet being the objective:

"Fishing Boats and Production: There are now 67 fishing boats in Abidjan. Production in 1963 was between 30,000 and 35,000 tons, valued at 45 CFA per kilo on the dock (approx. 8.2 U.S. cents per pound), or a total value on the dock of 1,350,000,000 to 1,575,000,000 CFA (approx. US$5.4 million to 6.3 million). To this must be added production from the traditional fishery of 15,000 tons of a value of 675,000,000 CFA (US$2.7 million).

"Projects: 1. Modernization of the fishing fleet.

"2. Creation of a joint company; The 'Fonde d' Aide et de Cooperation' (FAC) will finance 300,000,000 CFA (US$1.2 million).

"3. Construction of three fishing vessels for sardine and tuna to be equipped for freezing.

"Two private companies have already bought fishing vessels equipped for freezing. They will fish in the high seas, using the new 'pelagic trawl' and the purse seine for tuna. The 'pelagic trawl' will protect the deep-sea life.

"Traditional Fishing: For the small fishermen, some 10-ton fishing vessels built locally and equipped with Diesel engines will replace the motorized pirogues. These boats can be operated by Ivoirien fishermen with

Ivory Coast (Contd.):

little training and are not too expensive (3 to 4 million CFA) (approx. US$12,000 to $16,000).

"The Fishing Service of the Ivory Coast will get another fishing vessel for sardine and tuna, equipped with freezing facilities, and some fishermen will be trained on board as has been done before on the Reine-Pokou.

"Research Must be Directed to the Migrating Banks: The research directed to the migrating banks will provide continuous knowledge of the best fishing areas and the catching methods to be used.

"Construction of a Cold Storage: The fish market is very irregular in the Ivory Coast, and trade is very difficult. The Ivoirien Government has decided on the construction of a large cold-storage plant to help to stabilize the price of fish. The characteristics of the cold-storage are: 50 tons of ice per day; 400 tons of storage capacity at 0° C. (32° F.); 60 tons of freezing capacity; 1,500 to 3,000 tons of storage capacity at -20° C. (-40° F.); and 350 tons of fresh frozen food at less than -20° C.

"Expansion of Fish Distribution Facilities: This new cold-storage plant is the first step of a commercial fish distribution system for all of the Ivory Coast and the Upper Volta. At the end of this year the company 'Franco-Ivoirienne,' equipped with a freezer vessel of 55 meters (about 170 feet) in length, will produce 300 to 400 tons of fish monthly, frozen and packed in 23-kilogram cartons about 50 pounds. These will be sold locally and also delivered by trucks or by rail to the principal cities of the Ivory Coast.

"A Smoke-Curing City Fish Factories: Smoke-curing is in the long run the cheapest method of preservation. A project of a 'City of Smoke-Curing' is being studied. It will include 500 smoke-curing facilities and an area on which workers' housing will be built.

"There are already two tuna canneries which produce 40 tons of products daily. A project calling for a factory of 50 tons daily capacity will be realized soon. This plant will produce fish meal for human consumption and for animal consumption, and fish oils for industrial uses.

"At last we can say that the fishing industry in the Ivory Coast will see very important developments in the near future."

The United States fishery observer in Abidjan reports that most of the plans described in the article are proceeding. The new "Port de Peche" (Fishing Port) had been open for several months for unloading purposes, and construction of the cold-storage plant was about 25 percent completed. The vessel for the Fishing Service referred to in the article is the research and training vessel provided by the U. S. Agency for International Development which was expected to be delivered in a few months.

According to local Ivory Coast reports, the beginning of a fish distribution system as described in the article should take place in the fall of 1964, probably using the existing railroad (with terminus at Ouagadougou, Upper Volta) as the first means of transportation, with refrigerated trucks to come later. The two factories mentioned are the two small tuna canneries now existing (one cans pineapple in season and tuna when plentiful). Plans for a larger tuna cannery at the new "Port de Peche" are on paper, but are probably a little further away in actual realization than the other developments. (Fisheries Attache, United States Embassy, Abidjan, August 18, 1964.)

Note: See Commercial Fisheries Review, September 1964 p. 70.

Japan

EXPORT VALIDATIONS FOR FROZEN TUNA AND TUNA LOINS TO U.S.

January-July 1963-64: Japan's export validations of frozen tuna and cooked frozen tuna loins to the United States during January-July 1964 totaled 63,329 short tons, an increase of 21,267 short tons (50 percent) as compared with exports during the same period in 1963. Albacore exports increased 90 percent, yellowfin 18 percent, skipjack 18 percent, and tuna loins 68 percent. Exports of big-eyed tuna declined 13 percent. Only 1 short ton of bluefin tuna was exported during the period, compared with 374 short tons exported in 1963.

Japanese tuna industry sources attribute the heavier than normal frozen tuna exports to the United States for the first six months in 1964 as compared with last year's shipments during this period to: (1) good supplies of summer albacore caught off the coast of Japan, and (2) lack of demand for tuna by the Japanese tuna canning industry because of the

Japan (Contd.):

Japan's Export Validations for Frozen Tuna and Tuna Loins to U.S., Jan.-July 1963-64

Species	Direct	1964 Trans-shipped	Total	Direct	1963 Trans-shipped	Total	Total Exports 1963
			(Short Tons).				
Albacore, round	15,649	18,233	33,882	4,424	13,382	17,806	36,737
Yellowfin:							
Round	-	616	616	-	463	463	-
Gilled & Gutted:							
20/100 lbs.	14,761	2,182	16,943	11,312	3,248	14,560	-
100 lbs. up	1,517	-	1,517	164	-	164	-
Drsd. with tail	25	2,776	2,801	-	3,062	3,062	-
Fillets	33	12	45	195	96	291	-
Total	16,336	5,586	21,922	11,671	6,869	18,540	33,370
Big-eyed:							
Gilled & gutted	30	30	60	20	4	24	-
Drsd. with tail	-	170	170	-	240	240	-
Fillets	37	3	40	6	42	48	-
Total	67	203	270	26	286	312	316
Bluefin fillets	-	1	1	-	374	374	374
Skipjack, round	8	2,800	2,808	70	2,312	2,382	3,762
Loins:							
Albacore	2,117	-	2,117	1,111	-	1,111	2,998
Yellowfin	2,329	-	2,329	1,537	-	1,537	3,083
Bluefin	-	-	-	-	-	-	157
Total	4,446	-	4,446	2,648	-	2,648	6,238
Grand total	36,506	26,823	63,329	18,839	23,223	42,062	1/80,797

1/Revised.

sluggish market in the United States for tuna canned in brine. Direct shipments of round albacore increased from 4,424 short tons during January-July 1963 to 15,649 short tons in 1964, an increase of 254 percent; direct shipments of yellowfin increased 40 percent. Frozen tuna validated for export during January-July 1964 amounted to 78 percent of the total exported for the entire year in 1963. (Fisheries Attache, United States Embassy, Tokyo, August 19, 1964.)

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January-June 1963-64: Japan's export validations of frozen tuna and cooked frozen tuna loins to the United States during January-June 1964 totaled 48,434 short tons, an increase of 28 percent as compared with 37,948 short tons for the same period in 1963. Of the total shipments of 48,434 tons authorized to be shipped during that period in 1964, albacore amounted to 23,423 tons or 48 percent, yellowfin 18,398 tons or 38 percent, skipjack 2,781 tons or 6 percent, and tuna loins 3,710 tons or 8 percent. The shipment of big-eyed tuna authorized was very small.

In January-June 1963, the percentage exported by species was: albacore 42 percent, yellowfin 44 percent, skipjack 6 percent, and tuna loins 6 percent. Shipments of bluefin and big-eyed were very small. (Fisheries Attache, United States Embassy, Tokyo, July 27, 1964.)

Japan's Export Validations for Frozen Tuna and Tuna Loins to U. S., June 1964 and January-June 1963-64

Species	June 1964 Direct	June 1964 Trans-shipped	June 1964 Total	Jan.-June 1964 Direct	Jan.-June 1964 Trans-shipped	Jan.-June 1964 Total	Jan.-June 1963 Direct	Jan.-June 1963 Trans-shipped	Jan.-June 1963 Total
				(Short Tons).					
Albacore:									
Round	1,424	1,466	2,890	10,224	13,199	23,423	4,129	11,870	16,000
Yellowfin:									
Round	-	78	78	-	606	606	-	455	455
Gilled & Gutted:									
20/100 lbs.	3,400	80	3,480	12,119	1,996	14,115	10,332	2,392	12,724
100 lbs. up	284	-	284	1,281	-	1,281	164	-	164
Drsd. with tail	18	209	227	25	2,335	2,360	-	2,919	2,919
Fillets	-	-	-	33	3	36	195	93	288
Total	3,702	367	4,069	13,458	4,940	18,398	10,691	5,859	16,550
Big-eyed:									
Gilled & gutted	-	-	-	-	5	5	20	4	24
Drsd. with tail	-	55	55	-	79	79	-	199	199
Fillets	30	1	31	37	1	38	6	36	42
Total	30	56	86	37	85	122	26	239	265
Bluefin	-	-	-	-	-	-	-	374	374
Skipjack:									
Round	-	909	909	8	2,773	2,781	70	2,312	2,382
Loins:									
Albacore	415	-	415	1,854	-	1,854	881	-	881
Yellowfin	416	-	416	1,856	-	1,856	1,397	-	1,397
Total	831	-	831	3,710	-	3,710	2,278	-	2,278
Grand total	5,987	2,798	8,785	27,437	20,997	48,434	17,194	20,754	37,948

Source: Japan Frozen Food Export Association.

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ATLANTIC TUNA EXPORTS, JANUARY-JUNE 1964:

Japanese Atlantic-caught tuna exports approved by the Japan Export Frozen Tuna Producers Association during January-June 1964 are shown in the table. Transshipments of Atlantic tuna to the United States during that period totaled 19,887 short tons and exports

Table 1 - Atlantic Frozen Tuna Transshipments to the United States, January-June 1964 with Comparisons

Species	Year	Jan.	Feb.	Mar.	April	May	June	Total
				(Short Tons)				
Albacore	1964	2,689	4,048	3,130	598	948	1,649	13,062
	1963	3,502	3,725	2,467	1,678	265	162	11,799
Yellowfin	1964	1,260	663	869	868	323	867	4,850
	1963	564	705	1,085	1,731	1,209	50	5,344
Big-eyed	1964	-	-	3	-	2	81	86
	1963	59	22	19	77	43	-	220
Bluefin	1964	-	-	-	-	-	21	21
	1963	98	-	3	213	67	-	381
Skipjack	1964	184	153	86	315	590	540	1,868
	1963	193	301	261	592	129	-	1,476
Total	1964	4,133	4,864	4,088	1,781	1,863	3,158	19,887
	1963	4,416	4,753	3,835	4,291	1,713	212	19,220

Japan (Contd.):

Table 2 - Atlantic Frozen Tuna Exports to Italy, January-June 1964 with Comparisons

Species	Year	Jan.	Feb.	Mar.	April	May	June	Total
		(Metric Tons)						
Albacore	1964	60	37	18	13	24	65	217
	1963	267	-	114	353	57	141	932
Yellowfin	1964	2,059	1,282	1,134	1,615	1,305	1,253	8,648
	1963	668	135	577	3,653	3,990	1,904	10,927
Big-eyed	1964	650	200	134	250	298	437	1,969
	1963	530	243	216	628	735	645	2,997
Bluefin	1964	321	55	-	363	488	846	2,073
	1963	428	11	4	578	718	907	2,646
Skipjack	1964	-	-	-	16	-	-	16
	1963	-	-	-	-	-	-	-
Total	1964	3,090	1,574	1,286	2,257	2,115	2,601	12,923
	1963	1,893	389	911	5,212	5,500	3,597	17,502

Table 3 - Atlantic Frozen Tuna Exports to Other European & African Countries, January-June 1964 with Comparisons

Country of Destination	Quantity	
	1964	1963
	(Metric Tons)	
Yugoslavia	7,124	6,109
Other European & African Countries	4,936	1/

1/Quantity omitted due to misprint in the original Japanese article.

to Europe and Africa amounted to 24,983 metric tons. (Suisancho Nippo, July 10, 1964.)

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TUNA CANNERS AND EXPORTERS DISCUSS DROP IN EXPORTS OF CANNED TUNA TO U. S.:

The Japan Export Tuna Packers Association on August 12, 1964, held its fifth meeting to deliberate on ways and means of overcoming the slow movement of Japanese canned tuna in brine exports to the United States. At that meeting, the Association directors agreed to sell to exporters 900,000 cases of canned tuna in brine during the remainder of the business year (December 1963-November 1964)--450,000 cases during August and September, and 450,000 cases during October and November. Prices were to be determined at the board of directors meeting. In an effort to stimulate exports to assure attainment of that target, the directors agreed to have the Canned Tuna Sales Company (representing canners) conduct sales directly with the 18 outlet firms belonging to the Canned Foods Exporters Association, instead of selling to the Association, which is the procedure normally used.

Opinions within the Japan Foods Exporters Association on this latest canners' offer were divided, one group favoring the idea and the other opposing it to the extent of even urging that the exporters torpedo the packers' plan. On August 14, the Tuna Subcommittee of the Exporters Association formed a countermeasures committee to study the canners' new sales plan since it felt that direct dealings between packers and exporters may create undue competition among exporters and may even disrupt market conditions. The countermeasures committee met on August 17 and 18, but the details of the meeting were not disclosed. However, it seems likely that the Association will go along with the canners' offer of the 900,000 cases planned for export during the remainder of the business year.

Meanwhile, the Exporters Association agreed to provisionally export 35,000 cases of lightmeat tuna in brine packed in 4-lb. cans (6 cans to case). That shipment is part of the 80,000 cases of lightmeat tuna that had been scheduled for sale in July. Sales of the balance of 45,000 cases (7-oz. 48's and 13-oz. 24's) were being witheld pending conclusion of a price agreement with the canners. (Suisan Tsushin, August 12, 15, & 19; Suisan Keizai Shimbun, August 14, 1964.)

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REDUCTIONS PROPOSED FOR CANNED TUNA EXPORT QUOTA AND PRICES:

At a meeting between the Japan Canned Foods Exporters Association and the Japan Tuna Packers Association at Shimizu, Japan, in late July, the chairman of the Exporters Association's Tuna Committee proposed that the canned tuna export quota and packers' prices be reduced. In his proposals, which he described as his "personal suggestions," he stated that the 2.5-million-case export quota canned tuna in brine for the United States market during the current business year (December 1963-November 1964) was difficult to fulfill and that a more realistic export target would be 2 million cases. In this case, Japanese exporters would have to sell 925,000 cases to the United States during the remaining five months from July to November. By type of pack, he suggested that 585,000 cases of whitemeat tuna and 340,000 cases of light-

Japan (Contd.):

meat tuna should be sold and advised that no substitution should be made in case a supply shortage occurs in either type of pack.

Regarding canned tuna prices, he pointed out the need to substantially reduce prices in view of the present market situation in the United States. For whitemeat tuna he felt that the packers may have to continue granting the $1 promotional allowance per case for the time being because of the large inventory the packers were carrying, which would preclude a price reduction at this time. But he urged the packers to reduce the canned lightmeat tuna prices by $1 a case for No. ½ (7-oz.) 48's and by 50 cents a case for 4-lb. (66-oz.) 6's. (Minato Shimbun, August 1, 1964.)

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SLOW SALES OF CANNED TUNA STUDIED BY JAPANESE PACKERS AND EXPORTERS:

Japanese tuna packers and exporters as of mid-July 1964, stated that Japanese canned tuna in brine exports to the United States were said to have reached a turning point, demanding drastic changes to cope with the slow export trade. Canned tuna sales transacted for export to the United States up to and including the sixth sale totaled 1,080,000 cases (850,000 cases of white meat tuna and 230,000 cases of light meat tuna). At that rate of sales, Japanese packers and exporters see little prospects of attaining the 2.5-million-case quota established for export to the United States during the current business year (December 1963-November 1964) and are even uncertain that 1.7 million or 1.8 million cases could be exported by the end of the business year (November).

Japanese tuna packers attribute the slow movement of Japanese products on the United States market to the extensive advertising by United States packers, as well as to the problem of Japanese canned tuna prices. Japanese packing industry representatives who toured the United States observed that major United States packers were conducting extensive promotional sales to boost sales.

Japanese canned tuna in brine as of July 1964 were exported at f.o.b. Japan prices of US$10.50 a case for whitemeat tuna and $7.60 a case for light meat tuna. In the case of whitemeat tuna, the additional costs of freight, insurance, and broker's commission would increase the United States delivered price to $13.50 a case. In comparison, main United States brands of canned tuna were reported to be selling for $13-14 a case, private or other packers' labels for around $11 a case. (Suisancho Nippo, July 20; Suisan Keizai Shimbun, July 19, 1964.)

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CANNED-TUNA-IN-OIL EXPORT PRICES TO CANADA, 1964:

The Japan Canned Tuna Export Association set the following ex-warehouse and f.o.b. prices for canned tuna in oil for export to Canada in 1964. Export of canned tuna in oil in can sizes other than those shown will be considered by the Association when the need arises. (Fisheries Attache, United States Embassy, Tokyo, July 15, 1964.)

Japan's Export Prices for Canned Tuna in Oil to Canada, 1964

Category	Can Size	Price Per Case		
		Ex-Warehouse Japan 1/		F.o.b Yokohama
		Yen	US$	US$
White meat (solid)	No. 1 (13-oz.)/24's	2,780	7.66	8.30
	No. 2 (7-oz.)/48's	3,050	8.40	9.15
	No. 3 (3-1/2-oz.)/48's	1,750	4.82	5.35
	2 kilos (4.4 lbs.)/6's	3,240	8.93	9.65
White meat (chunk)	No. 1 (13-oz.)/24's	2,610	7.19	7.80
	No. 2 (7-oz.)/48's	2,880	7.93	8.65
	No. 3 (3-1/2-oz.)/48's	1,650	4.55	5.05
	2 kilos (4.4 lbs.)/6's	3,050	8.40	9.10
(flake)	No. 2 (7-oz.)/48's	2,210	6.09	6.70
Light meat (solid)	No. 1 (13-oz.)/24's	2,267	6.25	6.80
	No. 2 (7-oz.)/48's	2,452	6.75	7.40
	No. 3 (3-1/2-oz.)/48's	1,431	3.94	4.40
	2 kilos (4.4 lbs.)/6's	2,643	7.28	7.90
Light meat (chunk)	No. 1 (13-oz.)/24's	2,090	5.76	6.30
	No. 2 (7-oz.)/48's	2,270	6.25	6.90
	No. 3 (3-1/2-oz.)/48's	1,320	3.64	4.10
	2 kilos (4.4 lbs.)/6's	2,450	6.75	7.35
(flake)	No. 2 (7-oz.)/48's	1,969	5.42	6.00

1/Ex-warehouse price does not include brokerage, shipping, labeling, or packing.

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ALBACORE TUNA CATCH IN ATLANTIC IMPROVING:

More than half of the some 150 Japanese tuna vessels operating in the Atlantic Ocean this past summer were reported to be fishing off the South American coast, where albacore catches were said to be relatively good. Landings in that area were running about 70 percent albacore, 10-20 percent bluefin and bigeyed and less than 10 percent yellowfin. The preponderance of albacore landings is said to have created a favorable condition for tuna exports to the United States, and for that reason Japanese tuna exporters were closely watching albacore price developments in the

Japan (Contd.):

United States market, particularly since albacore export prices were said to be $10-15 below the earlier trading price of US$335 a short ton, f.o.b. Port of Spain. (Suisan Tsushin, July 16, 1964.)

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JAPANESE GOVERNMENT TO EXPLORE FOR ATLANTIC TUNA:

The Japanese Fisheries Agency is planning to charter the Fukushima prefecture-operated fishery guidance vessel Joban Maru (475 gross tons) to conduct tuna explorations in the Atlantic Ocean. The vessel was scheduled to depart Japan in early October 1964 on a two-months cruise to explore the waters fished by Japanese long-liners. The research objective of the vessel is to collect data on current, water and atmospheric temperatures, and other oceanographic conditions, as well as hook rates. Stations will be occupied on the lines connecting the points 27° W. longitude-20° N. latitude and 27° W. longitude-25° S. latitude, and the lines connecting the points 10° W. longitude-3° N. latitude and 10° W. longitude-25° S. latitude. (Minato Shimbun, July 24, 1964.)

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ATLANTIC TUNA FISHERY TRENDS, 1957-1964:

Available catch statistics show that the total Atlantic tuna catch by all countries amounted to less than 100,000 metric tons in 1957; however, by 1963 the catch had increased to nearly 200,000 tons. The increase was due mainly to an expansion of the Japanese Atlantic long-line fishery.

Japan's Atlantic tuna catch increased rapidly from 1957 (15,885 tons) to 1961 (82,251 tons), and then declined to 60,369 tons in 1962 despite increased fishing effort. The decline in 1962 was due mainly to a poor catch of yellowfin (down from 52,631 tons in 1961 to 26,857 tons in 1962). Japan's 1963 Atlantic tuna catch was reported in trade journals to total about 93,000 metric tons.

Estimates indicate Japan is now taking about half of the total Atlantic tuna harvest. The Japanese Atlantic tuna fleet increased from 26 vessels in 1957 to a reported 127 vessels in 1963 and an estimated 150-160 vessels in 1964. That increase, which showed particularly sharp acceleration in 1963 and in 1964, was due in large part to poor tuna fishing conditions in the South Pacific and Eastern Pacific, resulting in a shift of Japanese vessels to the Atlantic.

Japanese tuna fishing capability in the Atlantic in 1964 has been further developed by the establishment of two overseas fishing bases (Cape Verde Islands off the west African coast of Senegal, and St. Martin, Netherlands Antilles, in the Caribbean Sea).

Those developments mean that the Japanese catch (assuming "normal" fishing conditions) can likely be expected to increase by at least 10,000 metric tons in 1964.

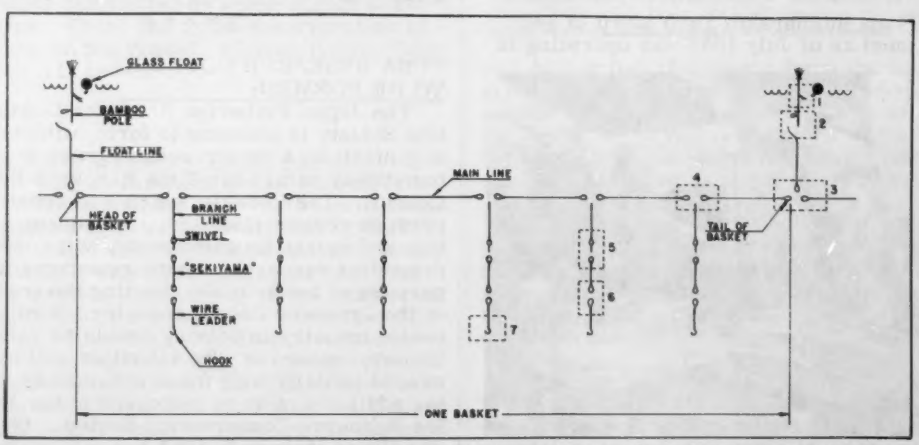

Diagram showing the component parts of a basket of tuna long-line fishing gear. Insets illustrate knots that are generally used in assembling the different sections.

Japan (Contd.):

The growing Soviet interest in tuna fishing may have significance for the Atlantic fishery. The U.S.S.R. is already engaged in experimental tuna fishing in the Indian Ocean and, according to press reports, has ordered five large tuna factoryships from Japan. The first of those factoryships, Leninskie Luchi (5,100 gross tons), which will carry six 20-ton portable boats, was launched in Japan in January 1964. A second vessel is expected to become operational in fall 1964. The specific ocean assignment of those tuna factoryships, which likely will use long-line gear, are unknown. However, Soviet trawlers operating off the Atlantic coast are reported to be observing the fishing techniques and operations of United States tuna purse-seine vessels.

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TUNA MOTHERSHIP FISHING TRENDS IN THE SOUTH PACIFIC:

A Japanese fishing company is planning on sending the tuna mothership Shinyo Maru (2,900 gross tons) to the South Pacific. The Shinyo Maru fleet, which has been assigned a production target of 5,000 metric tons, will operate in the vicinity of the Fiji Islands from October 1, 1964, until sometime in February 1965. During that period of the year, catch rates usually decline, so a larger number of catcher vessels will be assigned to the Shinyo Maru this year to assure a profitable trip. For a financially successful operation, it is said that each catcher vessel will have to land an average of 2.3 tons of fish per day.

The tuna mothership Yuyo Maru (5,040 gross tons) as of July 1964 was operating in the South Pacific off the Fiji Islands with good results. More than half of the 55 catcher vessels serving the Yuyo Maru were landing an average of at least 2.2 tons per day, 7 or 8 catcher vessels were averaging over 3 tons, and several were landing over 4 tons in 1 day. The catch was said to be predominantly yellowfin tuna. The Yuyo Maru expected to fulfill her production target of 5,300 tons by the scheduled withdrawal date of September 25, 1964. (Suisancho Nippo, August 1, 1964.)

A worker filleting a yellowfin tuna aboard a Japanese tuna mothership.

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GOOD TUNA LANDINGS AT CAPE VERDE BASE OFF WEST AFRICAN COAST:

Good tuna landings have been reported at Sao Vicente, Cape Verde Islands, where a storage and transshipment base was established in June 1964 by Japanese, Portuguese, and United States interests. A total of 993 tons of tuna were unloaded at the base during the period June 4-July 6, 1964, by six fishing vessels. Of that amount, over 700 tons were contracted for delivery to a Puerto Rican packing plant owned by the United States partners, about 250 tons were shipped to Japan, and a small quantity exported to Italy.

The Cape Verde Islands tuna base is being served by 10 fishing vessels, and there are plans to increase that fleet to 25 vessels in 1964. The base has a cold-storage capacity of 700 tons, which will be increased to 1,800 tons upon completion of the refrigeration plant now under construction. (Suisan Tsushin, July 31, 1964.)

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TUNA RESEARCH COUNCIL TO BE FORMED:

The Japan Fisheries Resource Conservation Society is planning to form, within its organization, a tuna research group to be tentatively named the Tuna Resource Research Council. The Council, which will consist of 20 persons representing the Government, industry, and scientific community, will conduct independent research on tuna resources for the purpose of better understanding the true state of the Japanese fishing industry. It will also assist industry in solving problems related to fishery resources. Its activities will be financed initially with funds obtained by assessing additional fees to members of the Fisheries Resource Conservation Society. (Suisancho Nippo, August 7, 1964.)

Japan (Contd.):

TWO NEW TUNA PURSE SEINERS ON TRIAL RUNS:

Two Japanese newly-built purse seiners (Kuroshio Maru Nos. 81 and 82, each of 140 gross tons) were undergoing trial runs off northeastern Japan in August 1964 in preparation for mothership-type purse-seine operations in the Atlantic Ocean. They were scheduled to depart Japan for West African waters in early September to fish (primarily for skipjack) off the coasts of Sierra Leone, Ivory Coast, and Ghana for a period of two years. Catches will be delivered to the bases of United States tuna-canning firms in West Africa. The Japanese firm owning the seiners plans to operate the freezership Chichibu Maru No. 2 (1,700 gross tons) as the mothership. (Suisancho Nippo, August 18, 1964.)

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JAPANESE TUNA MOTHERSHIP CREW DISMISSED FOR DISTURBANCE ABOARD:

All crew members, including the skipper, of the Japanese tuna mothership Showa Maru No. 1 (1,076 gross tons) were dismissed by the vessel owner. The vessel returned to Japan on June 25, 1964, one month earlier than scheduled, due to a disturbance aboard the vessel. The dismissal was on the grounds of neglect of duty.

Investigation by the vessel's owner revealed that the disturbance was caused not by the crew members' dissatisfaction over wages, as had been originally suspected, but by acts of violence committed by some unruly crewmembers. Those led to the deterioration of discipline on the vessel. (Suisan Keizai Shimbun, July 11, 1964.)

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JAPAN BUYS SALMON FROM ALASKA:

According to Japanese press reports, the sale of Prince William Sound salmon to Japan (as proposed by Alaskan Governor Egan on July 15, 1964), was negotiated this past summer with four Japanese fishing firms. The Alaskan salmon purchase by those four firms was approved by the Japanese Fisheries Agency on July 18 after a careful study was conducted by the Agency to make certain that the sale did not conflict with the Tripartite Fisheries Treaty (North Pacific Fisheries Convention) and that it would not disrupt the Japanese domestic market.

The four Japanese fishing firms made arrangements to dispatch refrigerated vessels to Prince William Sound to receive the catches for shipment back to Japan.

The quantity of salmon involved was 9,000-10,000 short tons. Evidently, this quantity was the basis on which the Japanese firms decided to dispatch 8 vessels with a total holding capacity of close to 11,000 tons.

Purchase prices agreed upon between the Alaska Fishermen's Union and Japanese buyers were 10.5¢ a pound for pink salmon and 8¾¢ a pound for chum salmon. Japanese buyers were also to pay the Alaskan State tax of 1.6¢ per fish and, in addition, transportation charges

The Japanese refrigerated vessel Akebono Maru No. 71 (a new vessel on its maiden voyage) docked at Cordova, Alaska, before moving out to buy salmon from United States fishermen in the Prince William Sound area. Of 1,470 gross tons, the vessel is one of the smaller vessels assigned to buy Alaska salmon.

of 1.5¢ per fish if distance from the fishing ground to the Japanese receiving vessels exceeded 15 miles. Those prices are said to approximate the delivery prices agreed upon between Japanese salmon catcher vessel owners and salmon mothership operators.

Practically all the pinks (the bulk of the purchase) were expected to be packed for export because of greater profits gained by packing, and all the chums were expected to be salted or frozen and sold on the Japanese domestic market.

The four Japanese fishing firms involved in the purchase agreed to pack all pink salmon purchases only for export to European countries, in order to avoid friction with Unit-

Japan (Contd.):

ed States packers. It was planned that packing of Alaskan pinks would not begin any earlier than November 1964, so until then the fish were expected to be kept frozen in cold storage. (Nihon Suisan Shimbun, July 20; Suisancho Nippo, July 21 & 22, 1964; Suisan Tsushin, July 22, 1964.)

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SALMON PURCHASES FROM ALASKA AS OF AUGUST 7, 1964:

The four Japanese companies engaged in buying Prince William Sound salmon from Alaskan fishermen received deliveries totaling 5,600 tons of salmon as of August 7, 1964. By species, they consisted of 70 percent pink, close to 20 percent chums, and a small quantity of reds. (Suisancho Nippo, August 12, 1964.)

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ALASKAN SALMON SALE TO JAPAN COMPLETED:

The sale of Alaska Prince William Sound fresh salmon to the Japanese ended on August 14, 1964. An estimated total of 7,400 tons of fresh salmon was delivered to the refrigerated vessels of the four Japanese fishing firms purchasing the fish. By species, they consisted of close to 80 percent pink, 20 percent chum, and small quantities of red and silver salmon. While deliveries exceeded the 6,000 tons reportedly guaranteed by the Alaskan sellers, the quantity was considerably below the 11,000 tons of vessel-carrying capacity provided by the purchasers.

Of the 8 Japanese vessels that were reported as having withdrawn from Prince William Sound, 4 returned to Gulf of Alaska waters to resume trawl operations, and another trawler and a shrimp mothership resumed operations in the Eastern Bering Sea. (Suisancho Nippo, August 18, 1964.)

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SALMON, CRAB, AND BOTTOMFISH MOTHERSHIP FISHERIES IN NORTH PACIFIC FIND POOR FISHING:

The 11 Japanese salmon motherships (accompanied by 369 catcher vessels), operating in the North Pacific Ocean north of 45° N. latitude (Area A), were experiencing unusually poor fishing as of late July 1964. Some fleets were not expected to fulfill their production targets by the August 10 closing date. As of July 20, the total salmon catch was reported as slightly over 33,000 metric tons, or 74 percent of the mothership fleet target of 44,665 metric tons. By species, that catch consisted of approximately 15,000 tons of chum, 10,000 tons of red, 4,700 tons of silver, 3,000 tons of pink, and 800 tons king salmon.

Fig. 1 - A type of Japanese fishery factoryship (accompanied by trawlers) that operates in the North Pacific and Bering Sea.

The 14 Japanese bottomfish mothership fleets operating in the northern waters (Okhotsk Sea, Bering Sea, and North Pacific Ocean) landed a total of 190,000 metric tons of bottomfish as of July 10. This was an increase of 60,000 metric tons over landings made during the same period in 1963. The production increase is due to the operation of one additional fish meal factoryship this year and to improved organization of fleet operations. There has been a notable catch increase in Alaskan pollock, herring, rockfish, and cod, whereas the high-priced halibut and sablefish landings have fallen below 1963 production. The Japanese Fisheries Agency estimates that the total 1964 mothership-type bottomfish landings will likely come up to 400,000 metric tons, compared with approxi-

Fig. 2 - Repairing crab baskets aboard a Japanese crab mothership.

Japan (Contd.):

mately 310,000 metric tons landed in 1963.

The 1964 mothership crab operations in the northern waters are reported to be progressing satisfactorily. The two crab motherships operating in the Bristol Bay had packed a total of 150,000 cases of canned crab meat as of July 15, and were expected to attain their production goal of 235,000 cases by the end of September. By fleet, the Tokei Maru (5,835 gross tons) had packed 80,000 cases (production target 120,000 cases), and the Dainichi Maru (5,858 gross tons), 70,000 cases (production target 115,000 cases). The four crab mothership fleets operating off the western coast of Kamchatka Peninsula had packed a total of 197,000 cases as of July 15 or close to 80 percent of their production target of 252,000 cases ($\frac{1}{2}$-lb. 48's). Production by fleet is: Yoko Maru (9,800 gross tons), 53,000 cases; Kaiyo Maru (5,449 gross tons), 48,000 cases; Hakuyo Maru (6,372 gross tons), 46,000 cases; and Seiyo Maru (6,404 gross tons), 50,000 cases. (Suisan Keizai Shimbun, July 24, 1964.)

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SALMON MOTHERSHIP FISHERY FOR 1964 CLOSES WITH CATCHES SLIGHTLY UNDER TARGET:

The 1964 Japanese mothership-type salmon fishery in the North Pacific Ocean north of 45° N. latitude (Area A) came to a close on August 10, 1964, with catches by all fleets falling slightly below assigned targets. The combined fleet catch totaled 44,483 metric tons, 182 tons below the quota of 44,665 metric tons allotted to the mothership salmon fishery. Composition of catch was reported as: 41 percent chum; 30 percent red; 22 percent silver (including a small percentage of king); and 7 percent pink salmon. The 11 Japanese salmon motherships engaged in the fishery were accompanied by 369 catcher vessels. (Shin Suisan Shimbun, August 17, 1964.)

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NORTH PACIFIC MOTHERSHIP SALMON PRICES ADJUSTED:

Negotiations between the Japan National Federation of Salmon Fishermen's Cooperative Associations (NIKKEIREN) and the Northern Water Salmon Mothership Council to establish final salmon delivery prices resulted in a settlement on August 5, 1964. The final 1964 prices represent a straight 7-percent increase over 1963 prices and are for fresh whole salmon delivered by catcher vessels to the motherships.

Following are the final Japanese North Pacific mothership 1964 salmon delivery prices with comparisons:

Species	1964 Prices		1963 Prices	
	Yen/kg.	U.S. Cents/lb.	Yen/kg.	U.S. Cents/lb.
Red	217.2	27.4	203.0	25.6
Chum	117.7	14.9	110.0	13.9
Pink	94.7	11.9	88.5	11.2
Silver	128.4	16.2	120.0	15.2
King	128.4	16.2	120.0	15.2

The newly negotiated price agreement replaces the provisional flat 5-percent increase agreed to on May 15, 1964, by NIKKEIREN and the mothership companies. (Suisan Keizai Shimbun, August 6; Suisan Tsushin, August 6, 1964.)

Editor's note: We have had several inquiries concerning the seemingly high prices for salmon paid to the Japanese fishermen. We have checked our sources carefully and believe the published prices are reliable. Despite the high cost of the raw product to the Japanese packers, we believe they are able to maintain their competitive position on the world canned salmon market for the following reasons:

1. Labor cost: The labor cost is very low. For example, our understanding is that the workers on the Japanese motherships receive an average salary of about $145 a month. At shore-based plants in Hokkaido, the cannery workers, mostly women, are provided, in addition to room and board, a monthly salary ranging from $20-30 a month.

2. Meat recovery: Recovery of meat per pound of fish is believed to be higher in Japan than in the United States. For example, meat attached to the head section is recovered manually by the Japanese and canned as "tid-bits."

3. Utilization of byproducts: Japanese packers pack salmon caviar incidentally to their canning operations. The value of this product, which has a special market in Japan, is reported to be substantial. For example, in 1963 processed pink salmon roe (caviar) is said to have sold for $4.00 a pound on the wholesale market. First grade roe of other species sold for about $20-25 a pound. The fact that Japan has arranged to obtain salmon roe from United States canneries further attests to the economic value of that product. Another byproduct is salmon carcasses. For example, on the motherships, scraps remaining from the canning operations are processed for later conversion into fertilizer.

4. Other products: Large quantities of pink and chum salmon are salted. The return to the packer on the salted product compares favorably to that for the canned product. Smoked salmon is becoming a popular item in Japan. Smoked red salmon has a ready market in West Germany and the United Kingdom. The return to the producer on this specialty item is reported good.

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EXPERIMENTAL NORTHWEST ATLANTIC TRAWL OPERATIONS:

The Japanese trawler Aoi Maru No. 2 (1,386 gross tons) has been conducting experimental trawl fishing in the northwest Atlantic Ocean off Newfoundland for about one-and-a-half years. She was scheduled to end operations by late July 1964, owing to expiration of her permit. The Japanese firm that owns the trawler does not intend to plan any further operations in the northwest Atlantic until it has evaluated the results of the experimental operations from all angles. Experimental fishing with the Aoi Maru has revealed that the

Japan (Contd.):

trawler is not properly designed and equipped for operation in the northwest Atlantic Ocean, where sea conditions have been found to be far more severe than in the Bering Sea.

Tenyo Maru No. 3 (3,500 gross tons), the second Japanese trawler conducting trial operations in the northwest Atlantic Ocean under a permit which expired in August 1964, was expected to remain longer in the northwest Atlantic trawling grounds if the Government approves the extension of her permit.

The Japanese Fisheries Agency, which had planned to license operation of the Northwest Atlantic trawl fishery this year, is reported to have decided to withhold decision on it until 1965, in view of the inconclusive results so far obtained from the experimental operations. (Suisan Keizai Shumbun, July 15, 1964.)

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ATLANTIC BOTTOMFISH RESOURCES TO BE SURVEYED BY JAPANESE FISHERIES AGENCY:

The Japanese Fisheries Agency is developing plans to actively conduct resource investigations in fiscal year 1965 (April 1965-March 1966), for the Japanese distant-water trawl fishery. Primary objective of the program is to gain a better understanding of the state of resources off the coast of Africa as well as in the northwest Atlantic Ocean, where greater fishing restrictions possibly may be imposed upon trawl operations now being conducted by various countries, including Japan.

Under present plans, the Fisheries Agency hopes to charter one 300-ton trawl vessel for exploratory operations off the African coast and also plans to have a Government fishery investigator board a large fishing company's research vessel to conduct investigations in the northwest Atlantic Ocean. (Shin Suisan Shimbun Sokuho, July 23, 1964.)

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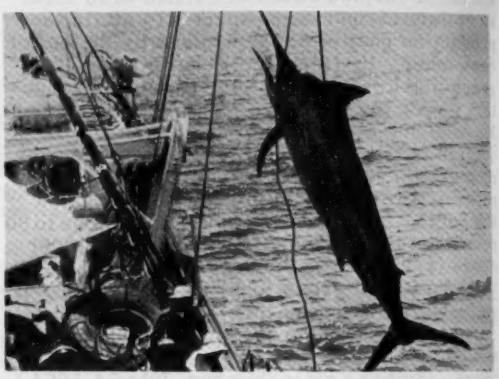
JAPANESE TO FISH SWORDFISH IN NORTHWEST ATLANTIC:

Three Japanese fishing vessels were scheduled in July 1964 to the northwest Atlantic fishing grounds on an experimental long-line swordfish operation. This is the first time that the Japanese vessels will be fishing for swordfish off the northwest Atlantic coast. The first vessel, An-ei Maru No. 7 (180 gross tons), departed Kesennuma, Japan, on July 18, and was to be followed by the Ryoun Maru (192 gross tons) and the Tenyo Maru (192 gross tons). The three vessels will operate out of Saint Pierre Island (French), off the coast of Newfoundland, and their catches will be either dressed or filleted, packaged, and frozen aboard the vessels. Products will be exported through the trading firm located at Saint Pierre Island. The three vessels are expected to land a total of 15,000 metric tons of swordfish in one year.



A swordfish being hauled aboard a Japanese catcher boat.

Japanese swordfish exports to the United States have been declining since 1963. Last year, exports dropped to 4,500 tons from 9,000 tons delivered in 1962. The export quota for 1964 is 5,500 short tons, 500 tons less than in 1963. The decline in exports reportedly is due primarily to good swordfish catches being made by United States fishermen along the Atlantic Coast following the change from harpoon fishing to long-line fishing in 1963. But it is also attributed to smaller swordfish landings being made by Japanese fishing vessels. (Nihon Suisan Shimbun, July 15 & 22, 1964.)

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EXPORTS OF CANNED SAURY, AUGUST 1963-JUNE 1964 AND ESTIMATES FOR FOLLOWING BUSINESS YEAR:

Japanese canned saury contracted for export during August 1, 1963-June 30, 1964, decreased 5.8 percent or 59,815 cases below the exports for the same period in the previous business year, announced the Japan Canned Saury Packers Association at a meeting held in July 1964.

The Japan Canned Saury Packers Association also adopted a production quota of 1.5 million cases of export canned saury for the 1964 business year (August 1964-July 1965), based

Japan (Contd.):

Table 1 - Japanese Exports of Canned Saury, August 1963-June 1964 and August 1962-June 1963

Country or Area of Destination	Aug. 1963-June 1964	Aug. 1962-June 1963
	(No. of Cases)	
Philippines	416,985	404,518
Burma	89,444	100,101
Egypt	90,000	148,053
New Guinea	221,665	155,034
Ceylon	85,000	119,875
Malaysia	19,041	64,410
Other countries	55,341	45,300
Total	977,476	1,037,291

ficer position in foreign countries, $4,800 to establish a nongovernment fishery representative position at overseas fishing bases, $31,500 to conduct water pollution control studies, $20,700 to establish health clinics for distant-water vessel crews, and $11,250 to improve the wireless telephone system used by Japanese fishing vessels. (Shin Suisan Shimbun Sokuho, July 29; Suisan Keizai Shimbun, July 29, 1964.)

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Table 2 - Estimated Japanese Canned Saury Exports for Business Year, August 1964-July 1965

Country or Area of Destination	In Tomato Sauce				Natural		Total
	1-Lb. Oval, 48's	8-Oz. Oval, 96's	5-Oz. Tall, 100's	1-Lb. No. 4 1/	5-Oz. Tall, 100's	1-Lb. No. 4 1/	
	(In 1,000 Cases)						
Philippines	170	20	30	30	140	310	700
Burma	70	-	-	130	-	-	200
Egypt	-	-	-	-	100	50	150
New Guinea	60	10	-	-	60	100	230
Ceylon	-	-	-	-	60	90	150
Malaysia	20	5	5	-	-	-	30
Other countries	10	5	5	5	5	10	40
Total	330	40	40	165	365	560	1,500

1/Japanese can size.

on export estimates for the 1964 business year. (Suisan Tsushin, July 11, 1964.)

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FISHERIES AGENCY BUDGET FOR FISCAL YEAR 1965:

The Japanese Fisheries Agency is requesting a budget of 26,875 million yen (US$74.7 million) for fiscal year 1965 (April 1965-March 1966--an increase of about 8,275 million yen ($22.9 million), or over 44 percent, above the budget of 18,600 million yen ($51.7 million) allocated in fiscal year 1964.

The 1965 budget submission shows that the Agency is requesting a large increase in appropriations for the coastal fishery improvement program--$7.3 million compared with $3.8 million in 1964. A sizable budgetary increase is also being requested for the fish marketing program in order to stabilize fish prices--$915,000 compared with $759,000 for the current fiscal year. A sum of $630,000 has been submitted for biological research related to international fisheries, compared with $383,000 budgeted in 1964.

For new programs, the Agency is requesting $51,500 to establish a resident fishery of-

COMPENSATION LAW FOR LOSS OF FISHING GEAR AND CATCH REVISED:

The Japanese Fisheries Agency disclosed that on April 24, 1964, Article 17 of the "Rules for the Enforcement of Fishing Vessels Compensation Law" was amended to compensate vessel owners for the value of the cargo of fish, fuel, and gear jettisoned to alleviate damage to a vessel when grounded, and to compensate vessel owners for the value of fishing gear actually in use and abandoned when pursued by a foreign patrol vessel. Under this amendment, compensation was to be based on the following formula:

$$\text{Compensation} = \frac{\text{Value of the vessel}}{\text{value of vessel + cargo, etc.}} \times \frac{\text{amount of insurance}}{\text{value of insured cargo, etc.}}$$

However, on June 25, 1964, that formula was deleted from the amendment by Ministerial Order, Ministry of Agriculture and Forestry, and a simple statement was substituted to the effect that compensation will be for the value of the cargo, fuel, and gear jettisoned to alleviate damage to a vessel when grounded and for the value of the gear abandoned which was in operation at the time of pursuit by a foreign patrol vessel. (Fisheries Attache, United States Embassy, Tokyo, July 14, 1964.)

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Japan (Contd.):

FISHERIES AGENCY STUDYING MEASURES TO COPE WITH OECD RECOMMENDATIONS:

The Japanese Fisheries Agency is studying measures to cope with developments likely to affect the Japanese fishing industry because of Japan's entry this year into the Organization for Economic Cooperation and Development (OECD). In view of the OECD fishery recommendations that subsidies and other financial supports to the fishing industries be reduced and progressively abolished, the Agency feels that OECD will, in the future, very likely urge Japan to place a curb on government loans to her fishing industry. (Suisan Keizai Shimbun, August 12, 1964.)

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EXTENSION OF PRIVATE KELP AGREEMENT WITH JAPAN RECOGNIZED BY SOVIETS:

Soviet Premier Khruschev, at a meeting held on July 14, 1964, with Japanese Socialist delegates who were in Moscow to discuss territorial problems with the Russians, is reported to have told the group that the Soviet Union intends to recognize the extension of the the present (one year) U.S.S.R.-Japan private kelp agreement over a period of two years. This announcement has been received favorably by the Japanese kelp industry as an act of goodwill by the Soviet Union. (Shin Suisan Shimbun Sokuho, July 16, 1964.)

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ADDITIONAL FOREIGN CURRENCY SOUGHT FOR SOUTH KOREAN FISHERY IMPORTS:

The Japan Fishery Products Importers Association, which earlier this year obtained foreign currency allocations of US$1 million from the Japanese Government to import fishery products from the Republic of South Korea, is seeking an additional $1 million for additional imports. The Association, which has already purchased $700,000 worth of cuttlefish and $300,000 worth of yellowtail from South Korea this year, hopes to import more yellowtail from that country during the fall and winter yellowtail fishing season.

Japanese imports of South Korean fishery products have been increasing yearly. In 1961, imports from that country totaled US$850,000, in 1962 $1 million, and in 1963 $1.3 million. Imports in 1964 are expected to show a substantial increase over the previous year. (Minato Shimbun, July 25, 1964.)

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MINISTERIAL CONFERENCE WITH CANADA CONVENED IN TOKYO:

The Japan-Canada ministerial conference to discuss economic and trade problems of the two countries was to be held in Tokyo, September 4 and 5, 1964. Problems related to the North Pacific Fisheries Convention and Canada's establishment of a 12-mile fishing zone were also to be discussed at that conference. The Japanese were hopeful that the Tokyo meeting would help resolve the problems associated with the North Pacific fisheries treaty arrangements between the United States, Canada, and Japan which were scheduled for further discussion by all three countries at another meeting in Ottawa at a later date. (Suisan Keizai Shimbun, August 5, 1964.)

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JAPANESE FISHERIES AGENCY AUTHORIZES PURCHASE OF DUTCH WHALING FACTORYSHIP:

The Japanese Fisheries Agency on August 5, 1964, authorized three Japanese fishing firms to jointly purchase the Netherlands Whaling Company's whale factoryship Willem Barendsz (26,830 gross tons), including that factoryship's 6-percent international whale-catch quota. The purchase of the Dutch whale factoryship will increase Japan's share of the international whale catch quota from 46 percent to 52 percent, or from 3,680 blue-whale units to 4,160 units, based on the 8,000 blue-whale catch limit informally adopted by the 4 whaling nations for the Nineteenth Antarctic Whaling Expedition. The Fisheries Agency also announced that the Japanese Government would recognize the catch quota adopted by the 4 whaling nations for the 1964/65 season. (Minato Shimbun, August 7, 1964.)

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TRAWLER SOLD TO GREEK FIRM:

The Japanese trawler Aoi Maru No. 2 (1,150 gross tons), which in late July 1964 concluded 1½ years of exploratory trawling in the Northwest Atlantic, has been sold to a Greek firm. Delivery will be made at Las Palmas, Canary Islands. The Japanese owners of the Aoi Maru No. 2 sold the trawler as a result of finding that the vessel was inadequately equipped and too small for trawl op-

Japan (Contd.):

erations in the Northwest Atlantic. (Suisan Tsushin, August 6 1964.)

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EXPERIMENTAL SUCTION-PUMP FISHING:
A suction pump has been used to catch fish in Japan, it was reported at a meeting of the Japan Fisheries Academy in Otaru. In the course of a survey of modern fishery methods, a team of the Nihon University's Fishery Department used a pump to land a catch weighing 12.5 kilograms (27.5 pounds) in 15 minutes.

Experiments with the pump were conducted from an 11-ton vessel in waters near Ajishima Island off the Ojika peninsula in May and June 1963. The suction pump was powered by an electric motor connected to a rubber hose, 5 meters (16.4 feet) long, with a trumpet-shaped mouthpiece at one end. Lights installed on the ship and fixed to the mouthpiece attracted fish. The technique had been tried in the Japanese fisheries before but on earlier occasions, the fish were invariably damaged.

Soviet fishing vessels are reported to have successfully employed the suction-pump fishing method in the Caspian Sea. (Australian Fisheries Newsletter, May 1964.)

Netherlands

WHALING FACTORYSHIP SOLD TO JAPAN:
The Netherlands Whaling Company has announced that it is selling its whaling factoryship Willem Barendsz to Japanese interests under a contract which has a duration of two years. At the end of that period, the vessel will be resold to the Netherlands Whaling Company at a predetermined price, as the Japanese are only interested in the catching rights attached to the factoryship. Those rights will be retained by the Japanese after the vessel is resold to the Netherlands. Before becoming effective, the contract for the sale of the Netherlands factoryship must be approved by the Japanese Government.

The management of the Netherlands Whaling Company has sold 2 of its 10 catcher vessels to Norway. The other 8 vessels will be sold as scrap. After the Willem Barendsz returns to the Netherlands, the company will try to sell the vessel as a freezership or as a tanker.

The Netherlands Whaling Company is disposing of its fleet as a result of disappointing results in the Antarctic in recent years. (United States Consulate, Amsterdam, July 23, 1964.)

New Caledonia

JAPANESE FISHING FIRM WITHDRAWS FROM TUNA BASE AT NOUMEA:
The large Japanese fishing company engaged in tuna fishing operations at Noumea, New Caledonia (French possession), has withdrawn. The firm is seeking the Fisheries Agency's permission to retain the 7,500-ton tuna quota allotted to the Noumea base.

The firm sent a representative to the Caribbean Sea islands to investigate the possibilities of establishing a tuna base in that area to facilitate tuna exports to the United States, Canada, and Cuba. (Suisancho Nippo, July 27, 1964.)

New Zealand

SOUTH COAST BLUEFIN TUNA EXPLORATIONS:
Bluefin tuna in New Zealand southern waters appear to be present in commercial quantities from mid-January to April. The statement was made by New Zealand's Marine Department following a three-week exploratory cruise off the Fiordland coast by the Department's chartered fishing vessel Olwyn.

Conclusions reached as a result of the explorations were: (1) tuna are found in temperatures as low as 12° C. (53.6° F.) and feed in depths as shallow as five fathoms; (2) tuna appear to be attracted by white lures in preference to other colors; (3) a trolling line of 60 feet appears to be most successful, providing a rubber spring is inserted to take the pull of the strike; and (4) vessels could fish for tuna in the calm of the sounds, providing the weather is suitable for rounding Puysegur Point at the southwest tip of New Zealand's South Island.

New Zealand (Contd.):

The objective of Olwyn's cruise was primarily to assess the potential of southern bluefin tuna and to study their distribution in relation to hydrological conditions in the area. The vessel was equipped with a live-bait tank and gear for pole fishing, and was also rigged to troll 8 lines.

Surface temperatures in Foveaux Strait were all below average but 3 tuna strikes were made just before the vessel rounded Puysegur Point. She then sailed to Dusky Sound and ran into a confused northerly sea and swell. Surface temperatures averaged 54.5° F. and the sea was a murky bottle green color. Under those conditions, 600 pounds of southern bluefin tuna were caught between Dusky and Nancy Sounds in 12 hours' trolling time.

Schools of tuna were sighted at the entrance to Charles and Bligh Sounds. At least 8 strikes were made in that area. The thermocline was at 120 feet and tuna were caught in depths ranging from 5 to 70 fathoms.

It was conceded by the Marine Department that considerable research will be needed before the commercial possibilities of that fishery can be assessed. The New Zealand Marine Department plans to be working on this project in the next year or so. (Commercial Fishing, a New Zealand fishery periodical, May 1964.)

* * * * *

TREND TO SMALL STERN TRAWLERS:

This year one New Zealand firm built two 70-foot stern trawlers. They were built by an Auckland shipyard.

Each stern trawler cost about NZ£35,000 (US$97,000) and carries a crew of three, including the skipper. A total of three small stern trawlers has been built.

Apart from normal trawling, one fishing firm plans to experiment with shrimp, tuna, and line fishing. Another firm is also reported to be looking for another two similar stern trawlers. It hopes to buy them overseas.

Both new trawlers for the one firm are identical and can store up to 40 metric tons of fish as compared with the 20 to 25 tons carried by ordinary small trawlers. (Commercial Fishing, New Zealand, May 1964.)

Norway

EXPORTS OF CANNED FISH, JANUARY 1-MAY 25, 1964:

Norway's total exports of canned fish during January 1-May 25, 1964, were down 5.1 percent from those in the same period of 1963. Shipments of canned small sild dropped 21.4 percent and those of kippered herring were down 10.6 percent. But shipments of canned brisling increased 15.6 percent from the same period a year earlier and there were some increases in the exports of several other canned fish products.

Norwegian Exports of Canned Fish

Product	1/Jan. 1-May 23 1964	Jan. 1-May 25 1963
	(Metric Tons)	
Brisling	2,209	1,911
Small sild	4,503	5,728
Kippered herring	1,187	1,328
Soft herring roe	805	349
Sild delicatessen	183	167
Shellfish	680	607
Other fishery products	1,173	1,232
Total	10,740	11,322

1/Preliminary.

The packing of sild sardines started in early May and by June 13, 1964, a total of 83,860 standard cases of small sild had been packed, compared with 89,952 standard cases in the comparable period of 1963.

The pack of brisling from the start of the season in late May to June 13, 1964, amounted to 121,114 standard cases, compared with 56,289 standard cases in the same period of 1963.

Mackerel landings for canning purposes totaled 92 tons as of June 6, 1964, compared with 188 tons in the corresponding period of 1963. (Norwegian Canners Export Journal, July 1964.)

* * * * *

CANNED FISH EXPORTS, JANUARY-MARCH 1964:

Smoked small sild sardines in oil was Norway's most important canned fish export in January-March 1964, accounting for 36.7

Norway (Contd.):

percent of the quantity and 30.7 percent of the value of total shipments during the period.

Table 1 - Norwegian Exports of Canned Fishery Products by Type, January-March 1964

Product	January-March 1964		
	Quantity	Value	
	Metric Tons	N. Kroner 1,000	US$ 1,000
Smoked brisling in oil	1,327	8,934	1,248
Smoked brisling in tomato	162	912	127
Smoked small sild in oil	2,259	9,841	1,374
Smoked small sild in tomato	374	1,342	187
Unsmoked small sild in oil	172	568	79
Small sild, unclassified	97	364	51
Kippered herring (Kippers)	754	3,380	472
Mackerel	159	765	107
Roe unclassified	163	626	87
Soft herring roe	134	679	95
Fish balls	118	305	43
Other canned fish	21	160	22
Shellfish	411	4,151	580
Total	6,151	32,027	4,472

Table 2 - Norwegian Exports of Canned Fishery Products[1] by Country of Destination, January-March 1964

Country of Destination	January-March 1964		
	Quantity	Value	
	Metric Tons	N. Kroner 1,000	US$ 1,000
Finland	54	292	41
Sweden	85	414	58
Belgium-Luxembourg	157	754	105
Ireland	49	207	29
France	67	265	37
Netherlands	46	157	22
United Kingdom	1,202	5,823	813
West Germany	181	710	99
Czechoslovakia	97	313	44
Japan	3	12	2
South Africa Republic	466	1,853	259
Iraq	40	150	21
Canada	149	899	125
United States	2,544	13,856	1,935
Australia	460	1,845	258
New Zealand	107	465	65
Other countries	234	884	123
Total[2]	5,941	28,899	4,036

1/Does not include exports of canned shellfish.
2/Totals are slightly larger than the combined exports of canned fish (excluding shellfish) shown in table 1.
Notes: (1) Norwegian kroner 7.16 equal US$1.
(2) See Commercial Fisheries Review, June 1964 p. 53.

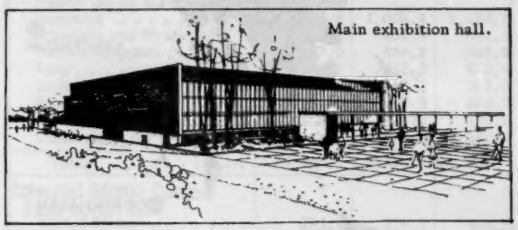
The United States was the leading buyer of Norwegian canned fish during January-March 1964, taking 42.8 percent of total shipments (excluding shellfish), followed by the United Kingdom with 20.2 percent, the South Africa Republic with 7.8 percent, and Australia with 7.7 percent. (Norwegian Canners Export Journal, July 1964.)

* * * * *

INTERNATIONAL FISHERIES FAIR AT TRONDHEIM:

Manufacturers of all types of machinery, equipment, and instruments for the fishing industry and related fields are invited to exhibit at the Second Official Norwegian Fisheries Fair which will be held at the exhibition hall in Trondheim, Norway, August 19-29, 1965.

The list of items to be displayed includes: (1) fishing craft and engines; (2) accessories such as anchors, chains, lanterns, tackle, galley equipment, fittings, searchlights, and lifesaving equipment; (3) navigational equipment such as radio, radar, asdic, and other instruments; (4) fishing gear such as seines, lines, nets, floats, trawls, hunting weapons; and impregnating materials; (5) fishermen's clothing and provisions; (6) fish processing machinery and refrigerating equipment; (7) manufactures (food and other); (8) transport appliances, containers, and store equipment; (9) angling equipment; (10) services provided by lifeboat associations, insurance companies, banks, publishers, etc.

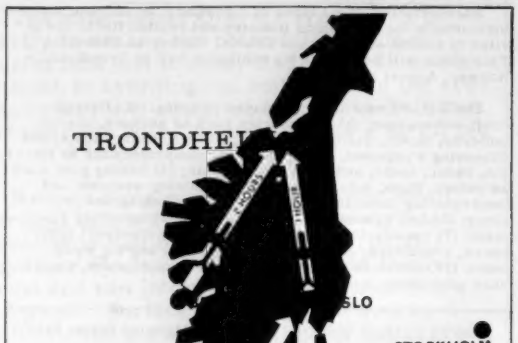


Main exhibition hall.

The Norwegian Ministry of Fisheries is sponsoring the Fair in order to improve the position of the Norwegian fishing industry by bringing to its attention the most efficient machinery, instruments, and auxiliary equipment available today.

The Fair offers United States manufacturers a unique opportunity to display and sell United States products to a large industry which must keep up with technological development in order to survive. For example, the Norwegian fishing in-

Norway (Contd.):



dustry has recently shown considerable interest in pumps for handling fish in nets or for unloading fish from vessels.

The trade exhibit will cover an effective floor area of about 32,000 square feet indoors and 21,000 square feet outdoors. Rental charges will be US$1.95 per square foot indoors with a minimum charge of $210 indoors and $1.11 per square foot outdoors with a minimum charge of $119. The deadline for space applications is December 1, 1964. Applications should be addressed to Norges Varemesse, P.O. Box 130, Skoyen, Oslo 2, Norway. (Cable Address: Varemessen.)

Arrangements for electricity, plumbing, and telephones should be made directly with the management. Electric current is 220 volts, 50 cycles. Insurance may be obtained locally. Samples and exhibits may be imported duty-free provided they are exported within eight months after their importation. Ample storage space is available. There will be restaurant facilities and parking space for visitors at the Fair.

The first official Norwegian Fisheries Fair was held in Bergen, Norway, in 1960. However, it was not open to foreign participation. (United States Embassy, Oslo, July 26, 1964.)

Peru

EXPORTS OF PRINCIPAL MARINE PRODUCTS, JANUARY-MARCH 1963-64:

Item	1/Jan.-Mar. 1964			Jan.-Mar. 1963		
	Quantity	Value2/		Quantity	Value2/	
	Metric Tons	Million Soles	US$ 1,000	Metric Tons	Million Soles	US$ 1,000
Fish meal . .	335,098	947.1	35,313	326,393	861.9	32,136
Fish oil . . .	31,879	96.4	3,594	56,887	88.9	3,315
Fish (frozen, canned, etc.)	5,759	49.6	1,849	7,318	48.9	1,823

1/Preliminary.
2/F.o.b. values converted at rate of 26.82 soles equal US$1.00.

Source: United States Embassy, Lima, July 9, 1964.

Portugal

REFRIGERATION EQUIPMENT TO MODERNIZE FISHING INDUSTRY SUPPLIED BY BRITISH:

In July 1964, a British firm announced a contract with the Fundo de Renovacao e de Apetrechamento da Industria de Pesca, Lisbon, to supply a considerable amount of refrigeration equipment for the fishing vessels and shore installations required in connection with the Portuguese Government's fisheries development plans. Under the agreement, the British firm expects to supply equipment with a value in excess of £800,000 (US$2,240,000).

The first order under the agreement covers freezing and cold-storage equipment for the five new stern trawlers being built at Portuguese shipyards in Viana do Castelo and Figueira da Foz. Each vessel will have a freezing capacity of over 28 tons of whole fish a day in 8 plate freezers and a storage capacity for about 500 metric tons of frozen fish at -25° C. (-13° F.). The installed power of the refrigerating machinery will be 285 B.hp. and it will operate on the pump circulation of Refrigerant 12 through the freezers, with brine-cooled pipe grids in the refrigerated holds.

South Africa Republic

PILCHARD-MAASBANKER FISHERY:

April 1964: The shoal fish catch off the Cape west coast of the South Africa Republic in April 1964 was 21,775 short tons pilchards, 7,954 tons maasbanker, 13,989 tons mackerel, and 3,636 tons anchovy for a total of 47,354 tons. That compares with 67,941 tons pilchards, 3,676 tons maasbanker, and 401 tons mackerel landed in April 1963.

The April 1964 catch yielded 10,527 short tons of fish meal, 576,890 imperial gallons of fish body oil, 421,656 pounds of canned pilchards, 1,198,424 pounds of canned maas-

South Africa Republic (Contd.):

banker, and 4,668,672 pounds of canned mackerel.

The Cape west coast shoal fish catch for the first four months of the 1964 season was 189,561 tons pilchards, 17,397 tons maasbanker, 41,733 tons mackerel, and 3,636 tons anchovy. The total catch was 252,327 tons. In the same period of 1963, the total catch was 260,546 tons, made up of 238,239 tons pilchards, 7,673 tons maasbanker, and 14,634 tons mackerel.

At Walvis Bay in South-West Africa, the pilchard catch amounted to 203,013 tons during January-April 1964. (The South African Shipping News and Fishing Industry Review, June 1964.)

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March 1964: The shoal fish catch off the Cape west coast of the South Africa Republic in March 1964 was 56,850 short tons pilchards, 6 tons maasbanker, and 17,751 tons mackerel for a total of 74,607 tons. That compares with 54,901 tons pilchards, 3,724 tons maasbanker, and 9,940 tons mackerel landed in March 1963.

The March 1964 catch yielded 17,082 short tons of fish meal, 886,350 imperial gallons of fish body oil, 141,768 pounds of canned pilchards, and 4,772,224 pounds of canned mackerel.

The Cape west coast shoal fish catch for the first three months of the 1964 season was 168,060 tons pilchards, 9,443 tons maasbanker, and 27,744 tons mackerel. The total catch was 205,247 tons. In the same period of 1963, the total catch was 188,538 tons, made up of 170,298 tons pilchards, 3,997 tons maasbanker, and 14,233 tons mackerel.

At Walvis Bay in South-West Africa, the pilchard catch amounted to 99,835 tons during January-March 1964. (The South African Shipping News and Fishing Industry Review, May 1964.)

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EXPORTS OF FISHERY PRODUCTS, 1963:

In 1963, fish meal was South Africa's most important fishery export item (from the standpoint of total value), followed by frozen spiny lobster tails, and canned pilchards. The United Kingdom was the leading market for South African fish meal, while the United States was

South Africa Republic[1] Exports of Fishery Products, 1963

Commodity and Destination	Quantity	Value[2]	
	1,000 Pounds	Rand 1,000	US$ 1,000
Fresh and Frozen:			
Spiny lobster tails:			
United States	11,978.2	8,098.5	11,281.2
France	214.6	133.2	185.5
Other countries	146.2	98.1	136.7
Total	12,339.0	8,329.8	11,603.4
Other fresh and frozen fishery products:			
Australia	8,025.6	1,068.4	1,488.3
Rhodesia and Nyasaland	5,496.2	604.8	842.5
United Kingdom	3,777.0	464.2	646.6
Italy	4,970.5	337.7	470.4
United States	1,882.1	190.2	265.0
France	963.4	198.3	276.2
Mozambique	1,514.8	109.6	152.7
Other countries	3,734.9	420.9	586.3
Total	30,364.5	3,394.1	4,728.0
Preserved (Mostly Canned):			
Spiny lobster tails:			
United States	291.2	218.2	304.0
France	139.6	89.7	125.0
West Germany	117.1	86.8	120.9
Belgium	62.0	48.4	67.4
Other countries	35.8	28.3	39.4
Total	645.7	471.4	656.7
Pilchards:			
United Kingdom	4,345.0	1,120.1	1,560.3
United States	4,827.3	732.2	1,019.9
Other countries	39,253.5	3,465.4	4,827.3
Total	51,345.5	5,317.7	7,407.5
Other preserved fishery products:			
United Kingdom	14,867.3	1,579.2	2,199.8
United States	7,694.3	671.1	934.9
Other countries	22,081.3	2,252.5	3,137.7
Total	44,642.9	4,502.8	6,272.4
Dried, Salted, and Cured:			
Australia	5,522.1	805.2	1,121.6
Other countries	4,109.8	327.3	455.9
Total	9,631.9	1,132.5	1,577.5
Industrial Products:			
Fish meal and solubles:			
United Kingdom	184,388.8	5,808.2	8,090.8
East Germany	64,853.4	2,042.3	2,844.9
West Germany	42,148.8	1,310.2	1,825.1
Japan	44,406.2	1,538.1	2,142.6
United States	24,400.9	708.7	987.2
Israel	24,135.6	724.6	1,009.4
Netherlands	23,403.6	717.9	1,000.0
Australia	11,377.0	350.0	487.6
Other countries	52,610.2	1,888.7	2,631.0
Total	471,724.5	15,088.7	21,018.6
Fish-body oil:			
United Kingdom	68,088.3	2,595.9	3,616.1
Other countries	1,989.6	105.1	146.4
Total	70,077.9	2,701.0	3,762.5
Fish-liver oil:			
Canada	379.4	24.4	34.0
United States	3/211.5	3/12.8	17.8
Other countries	26.3	2.4	3.3
Total	617.2	39.6	55.1

(Continued on next page.)

South Africa Republic (Contd.):

Commodity and Destination	Quantity	Value2/	
	1,000 Pounds	Rand 1,000	US$ 1,000
Whale and seal oil:			
United Kingdom	10,400.1	791.2	1,102.2
West Germany	6,663.2	506.1	705.0
United States	1,925.1	156.1	217.4
Netherlands	1,476.2	60.3	84.0
Other countries	210.8	36.1	50.3
Total	20,675.4	1,549.8	2,158.9

1/Includes South-West Africa.
2/F.o.b. value.
3/Includes exports to the United States of 2,100 pounds of concentrated fish-liver oil valued at Rand 2,070 (US$2,884).
Note: US$1.393 equals South African Rand 1.00.

the main buyer of South African lobster tails. (United States Consulate, Cape Town, July 28, 1964.)

Spain

FISHERY TRENDS AT VIGO, APRIL-JUNE 1964:

Landings and Prices: Fishery landings at the port of Vigo, Spain, in April-June 1964 totaled 18,755 metric tons valued at 213.8 million pesetas (US$3.6), an increase of 19.7 percent in quantity but a decrease of 6.9 percent in value from the first quarter 1964 landings. Compared with April-June 1963, landings this quarter dropped 26.5 percent in quantity and 32.2 percent in value.

The lower value of the second quarter 1964 landings was due to the light demand by fish canneries as they were reluctant to buy raw materials because of the large carryover of canned fish still on hand from the previous season. Normally, the April-June period is the beginning of accelerated cannery production but because of the ample canned fish stocks on hand the canneries were not disposed to produce at the usual normal rate.

Landings of frozen fish at Vigo (part of which is imported fish) totaled 2,738 tons in the second quarter of 1964, all of it landed during May as compared with landings of 3,686 tons in the first quarter of the year. The quantity of frozen fish landed in April-June 1964 is not included in the quarterly landings of fresh fish.

Fig. 1 - Port of Vigo, Spain. Wooden hull trawlers outfitted for tuna fishing.

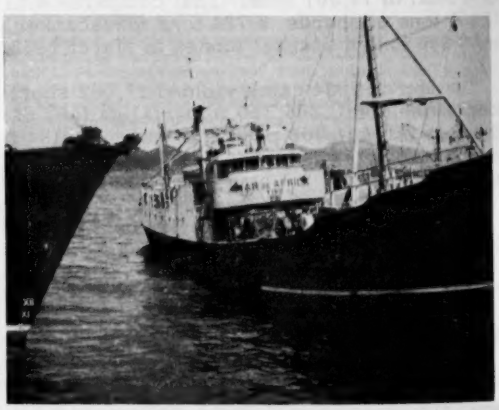


Fig. 2 - Cod fishing vessels docked at Vigo. They fish for cod in the North Atlantic.

Table 1 - Landings and Average Ex-Vessel Prices of Selected Species at Vigo, April-June 1964 with Comparisons

Species	1964						1963		
	April-June			January-March			April-June		
	Quantity	Average Price		Quantity	Average Price		Quantity	Average Price	
	Metric Tons	Pesetas/Kilo	US¢/Lb.	Metric Tons	Pesetas/Kilo	US¢/Lb.	Metric Tons	Pesetas/Kilo	US¢/Lb.
Octopus	3,495	5.03	3.8	906	7.09	5.4	6,903	5.14	3.9
Horse mackerel	3,431	2.58	2.0	1,934	4.69	3.5	3,473	3.46	2.6
Small hake	2,694	29.93	22.6	4,503	26.47	20.0	3,599	26.74	20.2
Cuttlefish	1,013	7.51	5.7	484	6.99	5.3	1,630	8.92	6.7
Sardines	585	5.86	4.4	-	-	-	1,191	8.16	6.2

Spain (Contd.):

Table 2 - Distribution of the Fishery Landings at Vigo, April-June 1964 with Comparisons

Period	Shipped Fresh to Domestic Markets	Canned	Other Distribution (Smoking, Drying Fish Meal, etc.) and Local Consumption
	(Metric Tons)		
2nd Quarter 1964	11,013	1,545	6,197
1st Quarter 1964	11,139	890	3,643
2nd Quarter 1963	10,083	5,214	10,232

Canned Fish Industry: The canned fish industry was practically inactive during April-June 1964 as far as production was concerned--only 1,545 tons of fish was packed as against 5,214 tons in the same period a year earlier.

Fig. 3 - Unloading semiprocessed or green salted cod at Vigo.

At the beginning of the second quarter in 1964 there was a substantial recovery in the quantity of exports of canned fish and the domestic market was also somewhat more active. The upturn was shortlived and fish canners were again reporting low sales at the end of June. In some cases, the movement in sales was brought about by lower prices quoted by canners who wanted to dispose of their excessive stocks to finance production from the new tuna and sardine season. In the case of the domestic market, summer always brings about a higher consumption of canned goods. The economic situation, however, was not favorable and the canned fish industry as a group was trying to obtain official assistance in this crisis.

Fig. 4 - Spanish fishing stern trawler Villalba, owned and operated by a Vigo fishery firm.

A group of leading Vigo fish canners was establishing a new factory in Ensenada, Mexico, in association with Mexican interests, for canning Pacific sardines. The production from the Ensenada plant will be sold in the Mexican market, but there are plans for exports to the United States later. (United States Consulate, Vigo, July 17, 1964.)

Note: See Commercial Fisheries Review, August 1964 p. 85.

Surinam

JAPANESE SHRIMP FISHING OPERATIONS:

The Japanese fishing firm (engaged in a joint enterprise) in Surinam, which was scheduled to ship frozen shrimp to Japan this past July, was established in Paramaribo a little over two years ago. The local United States-owned shrimp processing firm in Surinam (also located in Paramaribo) has been freezing and processing the Japanese shrimp catches and has been acting as their export agents. Except for the one shipment to Japan in July 1964 and another scheduled for September, shrimp caught by the Japanese vessels have been exported exclusively to the United States.

Prior to 1962, the Japanese firm operated 3 fishing vessels off the northern coast of South America (from Georgetown, British Guiana, to the mouth of the Amazon River). Those vessels carried small freezing units and were accompanied by a mothership to which catches could be transferred. Subsequently the mothership sank in the waters of that area.

During the past two years the Japanese fleet has expanded to 10 vessels to equal the size of the United States fleet presently operating out of Paramaribo. The catches of the Japanese trawlers account for about 50 percent of the United States shrimp processing firm's total exports. The 7 vessels purchased by the Japanese firm in the course of the past two years are of United States manufacture. Three are steel-hull trawlers purchased from a Texas shipyard and 4 are wooden-hull trawlers from a Florida shipyard. The present 10 Japanese vessels have 220 hp., and use the same type gear as used on vessels operated by the United States firm in Surinam. The Japanese trawlers have 3 drive winches, 150 fathoms of 7/16-inch steel cable, tickler chain, and are double-rigged. The United States trawlers generally use a flat net whereas the Japanese vessels prefer the balloon net. A few of the Japanese vessels have begun to copy the jib net such as is used by shrimp vessels operating out of Texas. A smaller mesh net of 1-3/4 inches (stretched) is used by the Japanese whereas the United States vessels use a net of 2-1/4 inches (stretched).

Until recently the crews of the Japanese trawlers in Surinam consisted solely of Japanese nationals. Reportedly, the Surinam Government has been exerting pressure to have the

Surinam (Contd.):

Japanese company conform with a local law requiring 75 percent of the employees of a locally-established company be Surinamers. One source in the local fishing industry there estimated that about an equal number of Surinamers and Japanese are now being employed. Some 35 Japanese nationals are affiliated with the company locally, including the manager, fleet manager, one office employee, and a mechanic. The Japanese personnel of the company were said to be paid from the Tokyo headquarters of the parent company, and receive about 35 to 40 Surinam guilders (about US$19 to $21) a month with the balance of their salaries delivered to their families in Japan. Surinamers employed on all trawlers are paid according to the catch, ranging from 25 to 75 guilders (about $13 to $40) per metric ton of shrimp caught. Japanese seamen have one-year contracts with the company and the contracts are renewable.

It was reported that all Japanese fishermen receive training in Japan prior to their assignment in Surinam. They are said to be highly adaptable and imitate successfully the methods used by American fishermen, and are also described as being collectivistic and scientific. Each Japanese vessel is assigned a certain area to fish each day and can only move to another area when advised to do so by the manager. The fishing grounds are carefully studied and information pertinent to shrimping in those waters is recorded at the company's local office. This past summer, a fishery technician from Japan went to Surinam as an adviser on how to improve the shrimp catches.

The local manager of the Japanese firm anticipated the purchase of 5 more trawlers in the United States during this year (1964). This will raise the total Japanese fleet operating out of Paramaribo to 15 vessels. It was also reported that the Japanese Government has approved the purchase of as many as 10 more trawlers in the United States. Ultimately, a fleet of 25 vessels is envisaged by the company.

The United States-owned local shrimp freezing, processing, and exporting enterprise was established in 1956. The company enjoys an exclusive license and franchise for the right to catch, handle, purchase, receive, process, freeze and warehouse, sell, and otherwise deal in shrimp for sale and consumption for export only. During the eight years of its existence, operations have expanded rapidly with 1963 exports totaling 1,318,600 pounds of frozen shrimp. Until early 1962 the plant was processing exclusively (or almost exclusively) the catches of United States flag vessels. (United States Consulate, Paramaribo, July 21, 1964.)

Note: Values converted at rate of 1.886 guilders equal US$1.

U.S.S.R.

NEW DEEP-WATER TRAWLING GEAR DEVELOPED:

Soviet gear experts are reported to have developed an improved type of bottom trawl gear that can withstand water pressure at great depths. The improved gear has reinforced floats; heavier (220-265 pounds) rope-length adjusting boards; and longer ropes of smaller diameter but with sufficient strength to withstand the pressure of net hauling by winches. The Soviets plan to use the deep-water gear soon for trawling at depths of up to 1,300 meters (4,264 feet) in the Barents Sea and the North Atlantic Ocean. In the Bering Sea and Okhotsk Sea, they hope to achieve a substantial increase in landings by using the new gear.

A Soviet RT-type trawler operated by the Soviet Northern Fisheries Administration has found halibut concentrations in the Barents Sea at depths of 850-1,100 meters (2,788-3,608 feet), according to a Japanese press summary of a Soviet news report, dated July 16, 1964. About 20 Soviet trawlers which were led to that area are reported to be making good catches. (Suisancho Nippo, July 29, 1964.)

United Kingdom

DANGER TO FISHERIES FROM OIL EXPLORATIONS IN NORTH SEA DISCUSSED:

The explorations for petroleum and natural gas in the North Sea were discussed by the British Minister of Power at a meeting at Lowestoft in late June 1964. The Minister said, "I must be frank with you and say that this search cannot be conducted without some interference with fishing, but I ask you not to be unduly anxious about what is going to happen. In the first place, the Convention on the Continental Shelf, which came into force earlier this month, requires the Government to ensure that the exploration of the British sector and its exploitation does not result in any unjustifiable interference with navigation, fishing, and conservation of the sea. This requirement will be incorporated in the licenses which my Department will issue and the licensees will have to observe."

The Minister said that the charges used by the ships engaged in the exploration would be exploded within a few feet of the surface thus minimizing danger to bottomfish. He added that the exploring oil companies would maintain close contact with British fishery officials.

The Minister stated that no charges in excess of 50 pounds would be exploded within 1 nautical mile of any vessel, and no charge at all within half a mile. (Fishing News, July 3, 1964.)

* * * * *

MARINE OIL IMPORTS, 1962-1963:

Net imports of marine oil by the United Kingdom in calendar year 1963 consisted of 117,400 long tons of fish and fish-liver oils, 60,400 long tons of whale oil, and (for statistical purposes) an additional 5,500 tons of whale oil from British Antarctic whaling op-

United Kingdom (Contd.):

erations--grand total of 183,300 tons. That was 4 percent below the net marine oil imports in 1962 which totaled 191,100 tons and consisted of 106,500 tons of fish and fish-liver oils, 57,000 tons of whale oil, and an additional 27,600 tons of whale oil from British Antarctic whaling operations.

British Utilization of Refined Oils and Fats in Margarine and Compound Cooking Fat Manufacture, 1962-1963

Item	Margarine		Compound Cooking Fat	
	1963	1962	1963	1962
	(1,000 Long Tons)			
Marine Oils:				
Whale oil	29.5	45.3	17.3	24.9
Fish oil	76.7	58.1	40.2	31.1
Total marine oil	106.2	103.4	57.5	56.0
Total utilization of vegetable, animal, and marine oils and fats	277.3	270.2	153.4	142.5

The United Kingdom withdrew from Antarctic whaling at the end of the 1962/63 season and sold her remaining whaling fleet to Japan.

The British margarine industry is an important consumer of marine oils. In 1963, there was considerable substitution of fish oils for whale oil in the production of British margarine and compound cooking fat; total utilization of marine oils by that industry in 1963 showed a small increase over the previous year. (United States Embassy, London, April 13, 1964.)

* * * * *

NEW FREEZER-TRAWLER SAILS ON MAIDEN VOYAGE:

The new stern-trawler Ross Valiant successfully completed trials in July 1964 and joined the Grimsby fishing fleet of one of Britain's largest integrated fishing companies. The Ross Valiant carries 10 plate freezers with a combined daily freezing capacity of 35 tons. The vessel will be able to store 400 tons of frozen fish at -20° F.

Fig. 1 - Ross Valiant off Grimsby about to start her maiden voyage to Newfoundland fishing grounds.

The company operating the Ross Valiant plans to add nine more freezer-trawlers to its fishing fleet and has already launched the Cape Kennedy, a sistership to the Ross Valiant. The Cape Kennedy is expected to enter service early in 1965. The company plans to market the frozen fish from its new freezer-

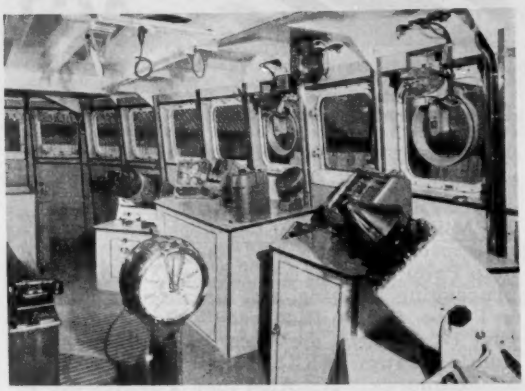


Fig. 2 - The bridge of the Ross Valiant. Shows echo-sounding equipment in the center and transistorized radar equipment to the left.

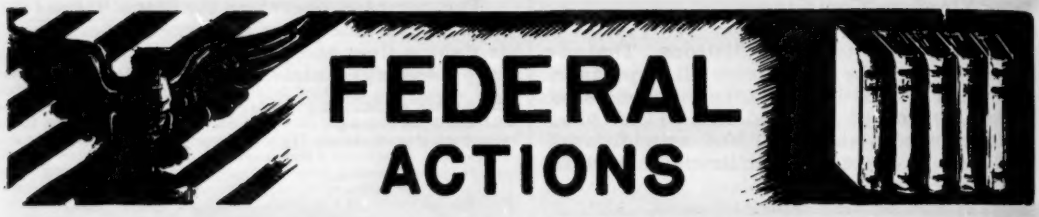
trawlers under a fixed-price contract arrangement in order to eliminate seasonal fluctuations and stabilize prices. The demand in Britain for fish frozen at sea has increased rapidly the past year.

Note: See Commercial Fisheries Review, April 1964 p. 76.

Yugoslavia

TUNA MARKET TO BE SURVEYED BY JAPANESE:

The Japan Export Trade Promotion Organization (JETRO), a Japanese government agency, was reported to be planning on conducting a tuna market survey in Yugoslavia. That country annually imports large quantities of frozen tuna to supplement domestic supply. In 1963, Yugoslavia's frozen tuna imports reportedly totaled 10,070 metric tons, of which 8,077 tons came from Japan, 794 tons from Italy, 448 tons from Israel, 460 tons from Turkey, and 291 tons from the United States. Yugoslavia, therefore, has become a very important tuna market for Japan, constituting the third largest buyer of Japanese tuna, next to the United States and Italy. (Suisan Keizai Shimbun, July 22, 1964.



Department of Commerce

AREA REDEVELOPMENT ADMINISTRATION

INDUSTRIAL LOAN TO TUNA FIRM IN PUERTO RICO:

Approval of a $654,576 industrial loan to help Peter Pan Caribe, Inc., establish a tuna-processing, canning, and distribution facility in Ponce, Puerto Rico, was announced August 17, 1964, by the Area Redevelopment Administration (ARA) of the U.S. Department of Commerce. The ARA loan will run for 16 years at an annual interest rate of 4 percent.

The project will help create 250 direct new jobs in the hard-hit Ponce area which has an unemployment rate of 14.4 percent, almost triple the United States national jobless average.

The total cost of the project will be $1,007,042. In addition to ARA's investment, a private bank will make a loan of $201,410; the Municipality of Ponce will provide $100,704; and the company will put up $50,352. Funds will be used to improve leased land, construct a building, and to buy machinery and equipment.

* * * * *

INDUSTRIAL LOAN TO HELP ESTABLISH NEW FISH MEAL AND OIL PLANT IN WISCONSIN:

Approval of a $130,000 industrial loan to help Peninsula Processing Company, Inc., establish a plant to process trash fish into meal, solubles, and oil, was announced August 19, 1964, by the Area Redevelopment Administration (ARA) of the U.S. Department of Commerce. The project is expected to create 86 direct and related new jobs in the Sturgeon Bay, Wis., area. It will also give Sturgeon Bay fishermen a market for the previously unwanted trash fish which had increased to the point of interfering with fishing operations for commercial species. The high protein and vitamin content of Lake Michigan trash fish will make it possible to process them into marketable poultry feed supplements.

The total project cost will be $200,000. In addition to the ARA loan that will run for 15 years at 4 percent annual interest, a savings and loan association will invest $40,000, a local county industrial development corporation will invest $20,000, and the applicant will put up $10,000 as equity.

* * * * *

TECHNICAL ASSISTANCE PROJECT TO STUDY PROPOSED DEEP-WATER PORT FACILITY AT ROCKLAND HARBOR, MAINE:

Approval of a $45,000 technical assistance project to determine the technical and economic feasibility of constructing a marine pier and terminal at Rockland, Maine, was announced August 20, 1964, by the Area Redevelopment Administration (ARA) of the U.S. Department of Commerce. The project will provide a detailed appraisal of the feasibility of the proposed deep-water port facility at Rockland Harbor, Knox County, Maine.

Earlier studies have indicated an overall feasibility. If the detailed examination shows the project worthwhile, ARA will consider an application for substantial improvement of the harbor facilities which would accommodate existing industries and pave the way for further expansion in the area. The economy of Rockland and its surrounding area has been geared historically to reliance on Rockland Harbor and related industries.

Local government leaders and spokesmen of fishing and business interests in Rockland attest that the harbor improvement is imperative to the needs of the community's future.

* * * * *

CLAM RESEARCH PROJECT IN MARYLAND TO BE CONTINUED:

Approval of a technical assistance project to continue clam research under a two-year contract extension with the Natural Resources Institute, University of Maryland, was announced August 14, 1964, by the Area Redevelopment Administration (ARA) of the U. S. Department of Commerce.

Research under the original one-year contract concentrated on basic ways to improve clam-processing techniques and the development of new methods to extend storage life through freezing and other procedures. Work will continue in that field and new emphasis will be placed on the development of quality products and new uses for clams, particularly the popular "ready-to-serve" type of product.

The Maryland seafood industry in Calvert, Dorchester, and Somerset Counties will benefit primarily by application of research results on the spot at existing clam-processing plants. Study results, however, will be applicable to the clam industry in many other areas of the United States.

The State of Maryland has already developed new clam-producing beds and a more efficient dredging process which is expected to expand clam production. A favorable outcome to the clam research project could substantially increase the market for clams and lead to the creation of new jobs and considerable added income for the industry and the area.

The total cost of the 2-year project will be about $220,000. ARA technical assistance funds will provide about $64,000. The remainder will come from various state and private sources including the University of Maryland and the clam industry.

Federal Trade Commission

RESTRAINT OF TRADE BY CRAB FISHERMEN'S ORGANIZATION IN WASHINGTON STATE BARRED:

An order (Docket No. 7859) announced August 7, 1964, by the Federal Trade Commission (FTC) requires a crab fishermen's association, in Westport, Wash., and its members, to discontinue their coercive restraints in, and their attempt to monopolize, the crab industry.

The association was organized in 1958 under the Fishermen's Collective Marketing Act. During the preceding 3-year period the price of crabs at the dock in Washington was about 8 cents a pound, although it had been as high as 20 cents in the past. Subsequent to its organization, the association fixed the price through marketing orders and had raised it to 16 cents by 1959. That year its members caught 74 percent of the crabs landed in the entire State of Washington, and apparently almost 100 percent of the catch in Grays Harbor, the most important of the State's 4 major crab port areas. Also in 1959 the association acquired a cannery. In 1960 that cannery accounted for some 45 percent of the total volume handled by the 7 processors located in the Grays Harbor district.

"Processing nearly 20 percent of the total volume of crabs landed in Washington, it is now the second largest processor in the State," the Commission noted. "The business of the other processors has declined accordingly. For example, the total volume of two of the largest of those processors fell from more than 3 million pounds each in 1958 to less than 1 million in 1961, and a large part of the crabs they processed in 1961 was bought not in Washington, but in Alaska. Several of the smaller Washington processors have gone out of business entirely, complaining that they can't pay the prices demanded by the association fishermen and stay in business." The Commission further found that respondents attempted to monopolize the market and that the newly acquired processing plant played a significant role in the attempt. "Further, when the processors yielded and resumed buying from the association fishermen, they were in fact subsidizing their own competitor. As previously noted, the association fishermen financed the purchase and operation of their own canning company by stock subscriptions of $1,000 each, payment for the stock to be made by turning over to the cannery, out of each sale of their crab catch, 1¢ for each pound sold, whether the sale was to the association cannery itself or to a third-party processor. (This 1¢ per pound figures to some 6-1/4 percent of the member's gross sales when the crabs are selling at 16¢.) The net effect of this arrangement, therefore, is that every time an independent Washington processor buys $1 worth of fresh crabs from a member of the association, 6-1/4¢ of the dollar he pays goes directly into the coffers of the association cannery, a competitor of his.

"Even assuming this to be fair competition ordinarily, it certainly becomes unfair when coupled, as here, with a substantial degree of monopoly power over the supply of the source product. Here, these respondents, using first their unlawfully acquired control of the crab fishing fleet, and then a combination of that power with their control of a substantial share of the processed product, levered the price of fresh crabs up from 14¢ (at the time the cannery was acquired) to 16¢ a pound. Having thus acquired an additional 2¢ in profits, the association fishermen then applied half of that gain--1¢--to the financing and strengthening of their own cannery. Hence, the cannery itself was financed not out of the lawful profits of the association fishermen, but out of funds extracted from the pockets of the independent processors by the use of coercively acquired monopoly power. . . .

The Commission held that there is 'no necessity for divestiture of respondents' processing plant. While devestiture would be an appropriate remedy if there was no other effective means of dissipating the effects of their attempted monopolization. . .such is not the case here. The monopolization attempt found here was accomplished by coercion and could only continue, we believe, by continued coercion. Deprived of that unlawful weapon, respondents will be restrained by competition from other crab fishermen, including the processors themselves. This, we think, will strike an even balance of power between the two segments of the industry, and protect the public interest in the survival and prosperity of both."

The FTC's order halting the coercive activities of the crab fishermen's association covers all aquatic products, not merely Dungeness crabs, and has no geographical limitation.

Department of Health, Education, and Welfare

FOOD AND DRUG ADMINISTRATION

NEW FOOD ADDITIVE REGULATION CONCERNING PACKAGING MATERIALS FOR FOODS PRESERVED BY IRRADIATION:

A regulation listing packaging materials which may be used, under prescribed conditions, in radiation preservation of prepackaged foods was issued by the Commissioner of Food and Drugs, effective August 14, 1964, as an amendment to food additive regulations (Title 21, Code of Federal Regulations, Part 121).

The new regulation as it appeared in the Federal Register, August 14, 1964, follows:

Title 21—FOOD AND DRUGS

Chapter I—Food and Drug Administration, Department of Health, Education, and Welfare

SUBCHAPTER B—FOOD AND FOOD PRODUCTS

PART 121—FOOD ADDITIVES

Subpart F—Food Additives Resulting From Contact With Containers or Equipment and Food Additives Otherwise Affecting Food

PACKAGING MATERIALS FOR USE IN RADIATION PRESERVATION OF PREPACKAGED FOODS

The Commissioner of Food and Drugs, having evaluated the data submitted in a petition (FAP 1297) filed by the U.S. Atomic Energy Commission, Washington, D.C., 20545, and other relevant material, has concluded that the food additive regulations should be amended to provide for the use of packaging materials that may be safely subjected to irradiation incidental to the radiation preservation of prepackaged foods. Therefore, pursuant to the provisions of the Federal Food, Drug, and Cosmetic Act (sec. 409(c)(1), 72 Stat. 1786; 21 U.S.C. 348(c)(1)), and under the authority delegated to the Commissioner by the Secretary of Health, Education, and Welfare (21 CFR 2.90; 29 F.R. 471), the food additive regulations are amended by adding to Subpart F the following new section:

§ 121.2543 Packaging materials for use in radiation preservation of prepackaged foods.

The packaging materials identified in this section may be safely subjected to irradiation incidental to the radiation preservation of prepackaged foods, subject to the provisions of this section.

(a) The radiation preservation of the food itself shall comply with regulations in Subpart G of this Part 121.

(b) The following packaging materials may be subjected to a dose of irradiation, not to exceed 1 megarad, incidental to the use of gamma radiation in the radiation preservation of prepackaged foods:

(1) Nitrocellulose-coated cellophane complying with § 121.2507.

(2) Glassine paper complying with § 121.2526.

(3) Wax-coated paperboard complying with § 121.2526.

(4) Polypropylene film prepared from polypropylene basic polymer complying with § 121.2501. The finished film may contain adjuvant substances used in compliance with §§ 121.2001 and 121.2511.

(5) Ethylene-alkene-1 copolymer film complying with § 121.2508.

(6) Polyethylene film complying with § 121.2510.

(7) Polystyrene film prepared from styrene basic polymer. The finished film may contain adjuvant substances used in compliance with §§ 121.2001 and 121.2511.

(8) Rubber hydrochloride film prepared from rubber hydrochloride basic polymer having a chlorine content of 30–32 weight percent and having a maximum extractable fraction of 2 weight percent when extracted with *n*-hexane at reflux temperature for 2 hours. The finished film may contain adjuvant substances used in compliance with §§ 121.2001 and 121.2511.

(9) Vinylidene chloride-vinyl chloride copolymer film prepared from vinylidene chloride-vinyl chloride basic copolymers containing not less than 70 weight percent of vinylidene chloride and having a viscosity of 0.50–1.50 centipoises as determined by ASTM method D 729–57. The finished film may contain adjuvant substances used in compliance with §§ 121.2001 and 121.2511.

Any person who will be adversely affected by the foregoing order may at any time within 30 days from the date of its publication in the FEDERAL REGISTER file with the Hearing Clerk, Department of Health, Education, and Welfare, Room 5440, 330 Independence Avenue SW., Washington 25, D.C., written objections thereto. Objections shall show wherein the person filing will be adversely affected by the order and specify with particularity the provisions of the order deemed objectionable and the grounds for the objections. If a hearing is requested, the objections must state the issues for the hearing. A hearing will be granted if the objections are supported by grounds legally sufficient to justify the relief sought. Objections may be accompanied by a memorandum or brief in support thereof. All documents shall be filed in quintuplicate.

Effective date. This order shall be effective on the date of its publication in the FEDERAL REGISTER.

(Sec. 409(c)(1), 72 Stat. 1786; 21 U.S.C. 348(c)(1))

Dated: August 10, 1964.

GEO. P. LARRICK,
Commissioner of Food and Drugs.

Department of the Interior

FISH AND WILDLIFE SERVICE

BUREAU OF COMMERCIAL FISHERIES

REGULATIONS FOR USE OF FISHERY RESOURCE DISASTER FUNDS ANNOUNCED: Regulations to cover the use of resource disaster funds under a section of the Commercial Fisheries Research and Development Act of 1964 were announced on August 27, 1964, by the U.S. Department of the Interior. Secretary of the Interior Stewart L. Udall said action now is being taken to assist the Great Lakes fishing industry recover from economic losses suffered in 1963. Fishermen, processors, and distributors of smoked chubs in the Great Lakes area are in serious difficulty as the result of a loss of market following an outbreak of botulism.

Funds are available under the Act during the 1965 fiscal year, which began July 1, 1964, to provide payments to the industry to help offset losses caused by removal of the chubs from normal channels of trade. The fish, now in storage, will be used for reduction into fish meal or will be destroyed.

Interior's Bureau of Commercial Fisheries will administer the payments after approved application on the following basis: No. 1 chubs, 21 cents per pound; No. 2 chubs, 7 cents per pound. An additional payment of 5 cents per pound may be made if processing costs totaling at least 5 cents have been incurred.

The Bureau said removal of the chubs from usual trade channels will open up markets for the depressed Great Lakes fishing industry and allow resumption of fishing operations which have been at a virtual standstill since last fall.

The regulations, published in the Federal Register, apply to Section 4 (b) of the Act. Regulations applying to other sections of the Act will be announced later.

Section 4 (b) authorizes the allocation of $400,000 annually for two years and $650,000 for each of the following three years to states where there is a commercial fishery failure due to a resouce disaster arising from natural or undetermined causes.

The regulations as they appeared in the August 27, 1964, Federal Register follow:

Title 50—WILDLIFE AND FISHERIES

Chapter II—Bureau of Commercial Fisheries, Fish and Wildlife Service, Department of the Interior

SUBCHAPTER F—AID TO FISHERIES

PART 253—COMMERCIAL FISHERIES RESEARCH AND DEVELOPMENT

On Pages 9454 through 9456 of the FEDERAL REGISTER of July 10, 1964, there was published a notice and text of a proposed new Part 253 of Title 50, Code of Federal Regulations. Authority to issue such regulations has been vested in the Secretary of the Interior by section 8 of the Commercial Fisheries Research and Development Act of 1964 (Public Law 88-309).

The purpose of the new part is to establish procedures to be used by the Secretary in providing financial assistance to State Agencies for research and development of the commercial fisheries resources of the Nation and, in cooperation with State Agencies, directly to the commercial fisheries in cases where the Secretary has determined that there is a commercial fishery failure due to a resource disaster arising from natural or undetermined causes.

The notice further provided for submission to the Director, Bureau of Commercial Fisheries, of written comments, suggestions or objections concerning the proposed regulations, within 30 days of publication in the FEDERAL REGISTER, except that comments with respect to § 253.4 Use of Resource Disaster Funds, had to be submitted within 10 days.

Comments have been received and evaluated for § 253.4. Minor changes for clarification purposes have been made.

Since early adoption of the proposed new § 253.4. Use of Resource Disaster Funds, is in the public interest in order to help relieve an emergency due to a commercial fishery failure in the Great Lakes area, this amendment is adopted as set forth below.

§ 253.4 Use of resource disaster funds.

(a) *Determination.* The Secretary shall cause to be published in the FEDERAL REGISTER a notice of finding that a commercial fishery failure due to a resource disaster arising from natural or undetermined causes exists at the time such a finding is made. After such publication, resource disaster funds may be used for the following purposes with the cooperation of the respective State Agencies:

(1) Payments causing the removal from the usual markets of stocks of fish or shellfish of the species listed in the said finding which are preventing normal trade operations. No payments will be made under this paragraph unless the Secretary deems such action necessary to aid in restoring normal trade operations; the person receiving such payment, if not the primary producer, provides evidence that he has reimbursed the primary producer, or such other person from whom the raw fish was purchased; the person receiving such payments has furnished the Secretary with such information regarding purchases, costs, sales, etc., as the Secretary may require; and satisfactory evidence of re-

moval of the products from channels of distribution, including storage, shall be provided to the Secretary. No payments may be made for any product which was removed from storage or other channels of distribution prior to the approval of this Act.

(2) Payments to primary producers of the species of fish listed in the said finding to assist them in obtaining gear or equipment necessary to operate in the same or a different fishery than that affected by the said resource disaster. No payments will be made under this paragraph unless the Secretary deems such action necessary to aid in restoring primary producers adversely affected by the said commercial fishery failure to a condition where they can operate profitably; the person receiving such payments furnishes the Secretary with such information regarding catches, sales and costs as the Secretary may require; and the person receiving such payments agrees to operate the gear purchased with the assistance of such payment in a manner satisfactory to the Secretary.

(3) Short-term loans for operating expenses of primary producers. When loans are made under this paragraph, the interest rate shall be 3 percent and repayment will be required only from net profits of the fishing operation, which net profit shall be reduced by such reasonable amount as determined by the Secretary for the salary of the fisherman. No such loans will be made unless the Secretary deems such action necessary to aid in restoring primary producers adversely affected by the said commercial fishery failure to a condition that will permit them to resume operations; the funds are not othewise available on reasonable terms; and the past earning and credit record of the applicant is such that it provides reasonable assurance of repayment.

(4) Payments to State Agencies for projects directly related to the restoration of the fishery affected by the said resource disaster or to prevent a similar failure of the fishery in the future. Such preliminary project proposals and their processing will be subject to all regulations relating thereto in this Part, except that these projects will be given preference over other proposed projects with reference to the use of funds obtained under subsection 4(b) of the Act, and Federal funds may be used for 100 percent of the cost of the project if all of the funds are obtained from appropriations authorized under subsection 4(b) of the Act.

(b) *Non-determination.* At any time when there is no finding of a commercial fishery failure as described in subsection (a) of this section, the Secretary may, if he deems such action to be in furtherance of the purposes of the Act, approve preliminary project proposals for funding under subsection 4(b) of the Act from funds carried over from previous fiscal years; provided however, that no preliminary project proposal from any State will be funded under this subsection until that State has had all of its available apportioned funds, if any, obtained from appropriations authorized under subsection 4(a) of the Act, obligated.

This amendment shall become effective on the date of publication in the FEDERAL REGISTER.

JOHN W. KELLY,
Acting Secretary of the Interior.

Note: See Commercial Fisheries Review, this issue p. 25; September 1964 p. 100.

Small Business Administration

LOANS TO NEW ENGLAND COMMERCIAL FISHERIES FIRMS IN JULY 1964:

Approval of 3 commercial fisheries loans in July 1964 was announced August 3, 1964, by the Boston Regional Office of the Small Business Administration (SBA), a $3,000 direct commercial fishing loan to run 6 years at 4 percent annual interest was made by SBA to Carl Sherman Purington of Addison, Maine. The loan funds were used to liquidate a 90-day note on Purington's vessel.

The Brown Fish Meal Company of Eastport, Maine, received a $7,500 direct loan from SBA. The firm will use the funds for debt retirement and as working capital. The loan was for 6 years at 4 percent annual interest. Both loans were made in depressed areas and were thus eligible for the low 4 percent interest rate.

Seafair Inc., Phippsburg, Maine, received a $15,000 direct loan from SBA for 6 years at 5½ percent annual interest. The loan helps provide building, equipment, and working capital for the firm which is operating a clam-cleansing plant.

Eighty-Eighth Congress

(Second Session)

Public bills and resolutions which may directly or indirectly affect the fisheries and

allied industries are reported upon. Introduction, referral to committees, pertinent legislative actions by the House and Senate, as well as signature into law or other final disposition are covered.

ALASKAN FUR SEALS: On September 1, 1964, Senator Bartlett spoke in the Senate on Alaskan fur seals and inserted in that day's Congressional Record (p. 20564) an article from the August 27, 1964, issue of the "New York Times" on the sealskin harvest in the Pribilof Islands.

ALASKA OMNIBUS ACT AMENDMENT: H. Rept. 1710, Amending the Alaska Omnibus Act (August 6, 1964, report from the Committee of conference, House of Representatives, 88th Congress, 2nd Session), 6 pp., printed. The Committee recommended that the Senate

recede from its disagreement to the amendment of the House to S. 2881, to amend the Alaska Omnibus Act to provide assistance to the State of Alaska for the reconstruction of areas damaged by the earthquake of March 1964 and subsequent seismic waves, and for other purposes; also that the Act be cited as the "1964 amendments to the Alaska Omnibus Act." Total amount authorized to be appropriated is not to exceed $55,650,000. Contains the amendments and statement of the managers on the part of the House.

Senator Gruening of Alaska spoke in the Senate on September 3, 1964, inserting in the Congressional Record (p. 20834), the message of the Governor of Alaska to the special legislative session called on August 31 in Alaska. Governor Egan outlined the steps necessary to implement the Federal assistance program.

ANADROMOUS FISH CONSERVATION: On August 12, 1964, the House Committee on Merchant Marine and Fisheries reported (H. Rept. 1768), with amendment, H. R. 2392, a bill to authorize the Secretary of the Interior to initiate a program for the conservation, development, and enhancement of the Nation's anadromous fish in cooperation with the several states.

H. Rept. 1768, Authorizing the Secretary of the Interior to Initiate a Program for the Conservation, Development, and Enhancement of the Nation's Anadromous Fish (August 12, 1964, report from the Committee on Merchant Marine and Fisheries, House of Representative, 88th Congress, 2nd Session), 15 pp., printed. The Committee favorably reported (with amendments) and recommended passage of H. R. 2392. Contains the purpose, need, background, and section-by-section analysis of the legislation, and departmental reports.

On September 1, 1964, House suspended the rules and passed, amended, H. R. 2392. As passed by the House, the bill authorizes the Secretary of the Interior to cooperate with the states in a program on behalf of anadromous fish. Up to $25 million could be appropriated from Federal funds for 50-percent cost-sharing in the program. Not more than 20 percent of the total could be spent in any one state. Involved are such species of fish as salmon, steelhead, shad, and striped bass.

CHEMICAL PESTICIDES COORDINATION: On September 1, 1964, the House suspended the rules and passed, amended, H. R. 4487, to amend the act of August 1, 1958, in order to prevent or minimize injury to fish and wildlife from the use of insecticides, herbicides, fungicides, and pesticides. Passed by a record vote of 236 yeas to 110 nays. As passed by the House, H. R. 4487 authorizes the Secretary of the Interior (Fish and Wildlife Service) to study the effects of pesticides on fish and wildlife and then transmit the information to the Secretary of Agriculture. Information on how injury to fish and wildlife can be prevented or minimized would then be printed on the labels of pesticide containers. Section 2 of the bill would raise the ceiling on pesticide research by the Service to $3.2 million for current (1965) fiscal year and $5 million annually thereafter. The ceiling under existing law is $2,565,000.

Objection was raised to the consideration of S. 1251, to amend the act of August 1, 1958, as amended, to increase the authorization for pesticide research by the Secretary of the Interior. The Senate thus must consider the House bill. Senate bill authorizes the same amounts for research as the House bill, but eliminates the section on labeling.

On September 3, 1964, the Senate passed H. R. 4487, after adopting an amendment to substitute for its text the language of S. 1251, companion bill, as it passed the Senate on June 22, 1964.

CONTINENTAL SHELF LANDS: H. R. 11961 (Aspinall), was introduced in the House July 21, 1964, at the request of the Department of Defense, to permit the Department of Defense and the Department of the Interior to furnish notice to Congress relating to the restriction of outer continental shelf lands for defense purposes; referred to the Committee on Interior and Insular Affairs.

FOOD-FOR-PEACE, AND FISH: Extension of P. L. 480, 83rd Congress (Hearing before the Committee on Agriculture and Forestry, United States Senate, 88th Congress, 2nd Session), 110 pp., printed. Contains hearing held August 12, 1964, on S. 1498, S. 2687, and S. 2925 to extend the Agriculture Trade Development and Assistance Act of 1954 (P. L. 480, 83rd Congress) and for other purposes. Contains statements from Senators, Federal officials, and representatives of associations.

On August 12, 1964, the Senate agreed to the amendment offered by Senator McGovern to H. R. 11380, a bill to amend further the Foreign Assistance Act of 1961, as amended, which authorizes the appropriation of $50 million under the authority of the foreign aid bill now before the Senate for the purchase of domestically-produced beef, poultry, other meats and meat products, dairy products, rice, and other high-protein foods which are in adequate supply in the United States for donation to school lunch and similar programs in foreign countries which are eligible for assistance under the bill. Senator McGovern stated that other high-protein foods would include fish and fish products. Senator Bartlett also submitted an amendment to implement the provision of P. L. 480 which added fish to the food-for-peace program, but he later withdrew the amendment after it was considered and discussed.

On September 2, 1964, the House adopted by a voice vote H. Res. 865, the rule providing for the consideration of and 2 hours of debate on H. R. 12298, to extend the Agriculture Trade Development and Assistance Act of 1954 (P. L. 480-83rd Congress). The House concluded all debate and commenced reading the bill for amendment but did not conclude consideration of the bill.

On September 3, 1964, by a record vote of 349 yeas to 6 nays the House passed H. R. 12298. The passage was subsequently vacated and S. 2687, a similar bill, was passed in lieu after being amended to contain the House-passed language. A substitute amendment that provided new text for section 1 of the bill was adopted that eliminated an amendment tentatively adopted earlier regarding congressional supervision and appropriations for the making of grants on loans of foreign currencies. The House insisted on its amendment to S. 2687, requested a conference with the Senate, and appointed conferees.

On September 10, 1964, the Senate disagreed to House amendments to S. 2687, to extend for 2 years the Agriculture Trade Development and Assistance Act of 1954, agreed to conference and appointed conferees.

HEALTH, EDUCATION, AND WELFARE APPROPRIATIONS FOR 1964: (Hearings before the Subcommittee of the Committee on Appropriations, United States Senate, 88th Congress, 2nd Session), Part 1, 1,074 pp., Part 2, 1,018 pp., printed. Contains hearings held on H. R.

10809, making appropriations for the Departments of Labor, and Health, Education, and Welfare, and related agencies, for the fiscal year ending June 30, 1965, and for other purposes. Includes statements and budget summaries from the agencies covered, as well as statements from outside witnesses. Included are funds under the Food and Drug Administration for botulism research, under the Public Health Service for water pollution control, shellfish sanitation, shellfish certification. Testimony was presented on the Public Health Service's two new laboratories for shellfish sanitation measures--one in Alabama to service the southern states and one in Rhode Island to serve the northeast. Also, on dams and oysters, and the depuration process for certain mollusks.

Bill reported in Senate August 17, 1964, by the Committee on Appropriations (S. Rept. 1460). Passed Senate, amended, August 19, 1964. Senate asked for a conference August 19, 1964, and House agreed to conference Sept. 1, 1964.

S. Rept. 1460, Departments of Labor, and Health, Education, and Welfare, and Related Agencies Appropriations Bill, 1965 (Aug. 17, 1964, report from the Committee on Appropriations, United States Senate, 88th Congress, 2nd Session), 82 pp., printed. The Committee on Appropriations recommended passage, with amendments of, H. R. 10809, appropriations for the Departments of Labor, and Health, Education, and Welfare, and related agencies for the fiscal year ending June 30, 1965, and for other purposes. Committee recommendations are presented and explained. Contains budget estimates for each agency. Under Department of Health, Education, and Welfare appropriations are funds for water supply and water pollution control; shellfish sanitation, shellfish certification; special investigation of water pollution in the lower Mississippi where large fish kills have occurred. Under Food and Drug Administration funds are included for botulism research.

A Senate-House conference committee on September 2, 1964, ordered a favorable report (H. Rept. 1880) on H. R. 10809. Conferees granted $35,009,000 for Water Supply and Pollution Control. The amount agreed upon includes $500,000 for a special investigation of water pollution in the lower Mississippi. No funds are included for the forward staffing of regional water pollution control laboratories, as proposed by the Senate.

H. Rept. 1880, Departments of Labor, and Health, and Welfare, and Related Agencies Appropriations Bill, 1965 (Sept. 2, 1964, report from the Committee on Conference, House of Representatives, 88th Congress, 2nd Session), 10 pp., printed. The Committee on Conference disagreed to Senate amendments on H. R. 10809, making appropriations for the Departments of Labor, and Health, Education, and Welfare, and related agencies, for the fiscal year ending June 30, 1965, and for other purposes. The Committee appropriated $35,009,000 for Water Supply and Water Pollution Control instead of $34,239,000 as proposed by the House and $35,354,000 as proposed by the Senate. The amount agreed upon includes $500,000 for special investigation of water pollution in the lower Mississippi where large fish kills have occurred. No funds are included for the forward staffing of regional water pollution control laboratories as proposed by the Senate. Contains the recommendations of the Committee of Conference, and a statement of the managers on the part of the House.

PACIFIC ISLANDS TRUST TERRITORY DEVELOPMENTS: On August 12, 1964, the House concurred in the Senate amendments to H. R. 3198, to promote the economic and social development of the Trust Territory of the Pacific Islands, and cleared the bill for the President. As amended by the Senate, the act provides that the Trust Territory would retain its current status as a "foreign area" for the purposes of the Tariff Act. On August 22, 1964, the President signed H. R. 3198 (P. L. 88-487).

PUBLIC WORKS APPROPRIATIONS, 1965: (Hearings before the Subcommittee of the Committee on Appropriations, United States Senate, 88th Congress, 2nd Session), Part 1, 1,248 pp.; Part 2, 1,166 pp.; printed. Contains hearings held on H. R. 11579, making appropriations for civil functions to allow for continuing progress in the nation's water resources development and for a limited number of new starts on surveys and planning and construction projects, for fiscal year ending June 30, 1965, and for other purposes. Functions are administered by the Department of the Army, certain agencies of the Department of the Interior, the Atomic Energy Commission, the Tennessee Valley Authority, and certain study commissions. Includes statements and budgets from the agencies concerned. Funds for Fish and Wildlife Coordination Act studies by the U. S. Fish and Wildlife Service are included.

H. R. 11579 reported by Committee on Appropriations June 11, 1964 (H. Rept. 1479). Passed by House June 16, 1964. Reported in Senate August 5, 1964, by Committee on Appropriations (S. Rept. 1326). Passed by Senate, amended, August 7, 1964. Senate asked for a conference same day; House agreed to conference August 12, 1964. Conference report filed August 13, 1964 (H. Rept. 1794). House and Senate agreed to conference August 14, 1964.

H. Rept. 1794, Public Works Appropriation Bill, 1965 (Aug. 13, 1964, report from the Committee of Conference, House of Representatives, 88th Congress, 2nd Session), 44 pp., printed. Committee of Conference disagreed to Senate amendments to H. R. 11579, making appropriations for certain civil functions administered by the Department of Defense, the Panama Canal, certain agencies of the Department of the Interior, the Atomic Energy Commission, the St. Lawrence Seaway Development Corporation, the Tennessee Valley Authority, and the Delaware River Basin Commission for the fiscal year ending June 30, 1965, and for other purposes. The Committee appropriated $210,000 for Fish and Wildlife Coordination Act studies by the Fish and Wildlife Service which is the same amount as the approved budget estimate for fiscal year 1965. Includes budget summaries from agencies covered, and appropriations recommended by House Committee of Conference.

STATE DEPARTMENT APPROPRIATIONS, FY 1965: Departments of State, Justice, and Commerce, The Judiciary and related Agencies Appropriations, 1965 (Hearings before the Subcommittee of the Committee on Appropriations, United States Senate, 88th Congress, 2nd Session), Part 1, 987 pp.; Part 2, 911 pp.; printed. Contains hearings held April 14-July 8, 1964, on H. R. 11134, making appropriations for the Departments of State, Justice, and Commerce, The Judiciary, and related Agencies for the fiscal year ending June 30, 1965. Contains testimony and statements from various Federal officials and Senators. Included in State Department appropriations are funds for the International Fisheries Commissions.

S. Rept. 1380, Departments of State, Justice, and Commerce, the Judiciary, and Related Agencies Appropriations Bill, 1965 (Aug. 12, 1964, report from the Committee on Appropriations, United States Senate, 88th Congress, 2nd Session), to accompany H. R. 11134, 29 pp., printed. The Committee recommended passage (with amendments) of H. R. 11134, appropriations for the Departments of State, Justice, and Commerce, the Judiciary, and related agencies for fiscal year ending June 30, 1965, and for other purposes. Committee recommendations are presented and explained. Contains a general statement, budget estimates for each agency, and major provisions of the bill. Included under Department of State are funds for International Fisheries Commission. The Senate Committee recommended $2.1 million for this item--$100,000 over the House allowance, but $39,000 under the budget estimate.

H. Rept. 1817, Departments of State, Justice, and Related Agencies Appropriations Bill, 1965 (Aug. 15, 1964, report from the Committee of Conference, House of Representatives, 88th Congress, 2nd Session), 7 pp., printed. The Committee of Conference disagreed to Senate amendments to H. R. 11134, making appropriations for the Departments of State, Justice, and Commerce, the Judiciary and related agencies for the fiscal year ending June 30, 1965, and for other purposes. Contains the recommendations of the Committee of Conference and a statement of the managers on the part of the House. Under the Department of State, the Committee recommended for International Fisheries Commission $2,025,000 instead of $2.0 million as proposed by the House and $2.1 million as proposed by the Senate.

On August 17, 1964, the House and Senate adopted the conference report (H. Rept. 1817) on H. R. 11134, making appropriations for the Department of State for FY 1965, clearing the legislation for the President. Included in the compromise bill is $2,025,000 for International Fisheries Commissions, an increase of $25,000 over the House-passed bill, but $75,000 less than the amount recommended by the Senate. The 1965 appropriation is $25,000 more than the amount appropriated for FY 1964, but $114,000 less than the amount requested in the Department's FY 1965 budget estimate.

VESSEL CONSTRUCTION SUBSIDY AMENDMENTS: On August 18, 1964, the Senate agreed to House Amendments to S. 1006, for the correction of inequities in the construction of fishing vessels and cleared the bill for the President. On August 30, 1964, the President signed S. 1006 (P.L. 88-498).

VESSELS OF THE UNITED STATES, 1964: H. Doc 274, Merchant Vessels of the United States, 1964 (Including Yachts), 1,272 pp., printed. House of Representatives, 88th Congress, 2nd Session, 1964. Lists every American merchant vessel (including fishing vessels and yacht which had an uncanceled document on January 1, 1964. Also specifies official number, signal letters, name, rig, tonnage, home port, and place and date of construction of every such vessel. Annual publication of Bureau of Customs, Treasury Department, to comply with act of Congress. (For sale by the Superintendent of Documents, U. S. Government Printing Office, Washington, D. C., 20402, at $7.25 a copy.)

WATER POLLUTION: On September 10, 1964, Senator Morse spoke in the Senate and inserted in that day's Congressional Record (pp. 21305-21306) an article from the September issue of American Forest entitled "Pollution: Everybody's Fight." The article gives particular attention to the discharge into rivers and streams of industrial waste and sewage from numerous towns, cities, and industries. Also to the problem that salmon and steelhead runs in Oregon cannot be maintained if water quality is not improved. There is concern for 70 million chinook salmon planted in the Willamette during the spring of 1964 by that State's Fish Commission and the U. S. Fish and Wildlife Service. Congressman Green inserted the same article in the Appendix of the same Congressional Record (pp. A4667-A4669).

WATER POLLUTION CONTROL ADMINISTRATION: Water Pollution Control and Abatement (Part 1A & 1B--National Survey)--(Hearings before a Subcommittee of the Committee on Government Operations, 88th Congress, 1st Session), Part 1A, 940 pp.; Part 1B, 972 pp., printed. Contains hearings held May 21-24, 27-29; June 3-6, 10-14, 18, 20, & 25, 1963. The Committee held hearings on Nation's problems of water pollution and what should be done to control and abate them. Contains statements given by Congressmen, Senators, various Federal and state officials, conservation groups, industry representatives, and others.

On September 2, 1964, the House Committee on Public Works met in executive session on S. 649, and related bills, regarding water pollution. No final action was taken and the Committee continued in executive session on September 3, 1964.

On September 3, 1964, the House Committee on Public Works ordered favorably reported to the House S. 649, and related bills regarding water pollution, to amend the Federal Water Pollution Act, as amended, to establish the Federal Water Pollution Control Administration, to increase grants for construction of municipal sewage treatment works, to provide financial assistance to municipalities and others for the separation of combined sewers, to authorize the issuance of regulations to aid in preventing, controlling, and abating pollution of interstate, or navigable waters, and for other purposes. On September 4, 1964, the House Committee on Public Works reported to the House S. 649.

WATER RESOURCES COUNCIL: On August 21, 1964, Congressman Donohue under an extension of remarks in that day's Congressional Record (pp. A4505-4506) urged that appropriate steps be taken to bring before the House for passage before the Congress ends S. 1111, to provide for the optimum development of the Nation's natural resources through the coordinated planning of water and related land resources, through the establishment of a Water Resources Council and river basin commission, and providing financial assistance to the states in order to increase state participation in such planning.

On September 2, 1964, the House Committee on Interior and Insular Affairs reported, amended, S. 1111 (H. Rept. 1877). Referred to the House Committee of the Whole House on the State of the Union.

WHALE CONSERVATION: On September 8, 1964, Senator Bartlett of Alaska spoke in the Senate on the depletion of the whale population, and inserted in that day's Congressional Record (pp. 21033-21034) an article from the August 1964 issue of the Seattle "Fishermen's News" concerning Japan's obligations under the International Whaling Convention.

FISH AND WILDLIFE SERVICE PUBLICATIONS

THESE PROCESSED PUBLICATIONS ARE AVAILABLE FREE FROM THE OFFICE OF INFORMATION, U. S. FISH AND WILDLIFE SERVICE, WASHINGTON, D. C. 20402. TYPES OF PUBLICATIONS ARE DESIGNATED AS FOLLOWS:

CFS - CURRENT FISHERY STATISTICS OF THE UNITED STATES.
FL - FISHERY LEAFLETS.
MNL - REPRINTS OF REPORTS ON FOREIGN FISHERIES.
SEP.- SEPARATES (REPRINTS) FROM COMMERCIAL FISHERIES REVIEW.
SL - STATISTICAL LISTS OF DEALERS IN AND PRODUCERS OF FISHERY PRODUCTS AND BYPRODUCTS.
SSR.- FISH. - SPECIAL SCIENTIFIC REPORTS--FISHERIES (LIMITED DISTRIBUTION).

Number	Title
CFS-3478	Michigan Landings, January 1964, 2 pp.
CFS-3484	New Jersey Landings, 1963 Annual Summary, 10 pp.
CFS-3490	New York Landings, 1963 Annual Summary, 12 pp.
CFS-3509	Massachusetts Landings (By Gear and Subarea), 1963 Annual Summary, 14 pp.
CFS-3523	Frozen Fishery Products, May 1964, 6 pp.
CFS-3534	Louisiana Landings, April 1964, 3 pp.
CFS-3538	Maine Landings, April 1964, 4 pp.
CFS-3539	Texas Landings, September 1963, 3 pp.
CFS-3541	Texas Landings, October 1963, 3 pp.
CFS-3542	Maryland Landings, 1963 Annual Summary, 11 pp.
CFS-3543	New Jersey Landings, May 1964, 3 pp.
CFS-3544	Ohio Landings, March 1964, 2 pp.
CFS-3545	Wisconsin Landings, April 1964, 2 pp.
CFS-3546	Michigan Landings, April 1964, 3 pp.
CFS-3547	Ohio Landings, April 1964, 3 pp.
CFS-3548	Texas Landings, November 1963, 2 pp.
CFS-3549	Texas Landings, December 1963, 2 pp.
CFS-3550	Rhode Island Landings, February 1964, 3 pp.
CFS-3554	Louisiana Landings, May 1964, 3 pp.
CFS-3556	Maryland Landings, April 1964, 4 pp.
CFS-3558	Maryland Landings, May 1964, 4 pp.
CFS-3560	North Carolina Landings, June 1964, 4 pp.
CFS-3561	Wisconsin Landings, May 1964, 2 pp.
CFS-3562	Maine Landings, May 1964, 4 pp.

Wholesale Dealers in Fishery Products, 1963 (Revised):

SL- 4 - Rhode Island, 2 pp.
SL- 6 - New York Coastal Area, 11 pp.
SL- 7 - New Jersey, 4 pp.
SL- 8 - Pennsylvania (Coastal Area), 3 pp.
SL-13 - North Carolina, 6 pp.
SL-17 - Alabama (Coastal Area), 3 pp.
SL-18 - Mississippi (Coastal Area), 3 pp.
SL-19 - Louisiana (Coastal Area), 7 pp.
SL-20 - Texas (Coastal Area), 7 pp.
SL-22 - Oregon, 3 pp.
SL-23 - Washington, 6 pp.
SL-33 - North Dakota, 1 p.
SL-46 - Texas (Mississippi River and Tributaries), 2 pp.

Sep. No. 709 - A Progress Report on the Development of International Food Standards.

FL-555 - The Lake Trout (Salvelinus namaycush), by Paul H. Eschmeyer, 8 pp., illus., February 1964. Discusses the lake trout's physical characteristics, geographic distribution, reproduction, young of the species, age and growth, food, movement, artificial propagation, and fisheries. Also discusses the depredations of the sea lamprey on lake trout in the Great Lakes.

FL-561 - List of Fish and Wildlife Service Papers on Physical and Chemical Oceanography, 1940-1962, by Lola T. Dees, 15 pp., March 1964.

FL-566 - Bacterial Kidney Disease of Salmonid Fishes, by Ken Wolf, 4 pp., revised March 1964.

FL-570 - Basic List of Publications in English on Fish Diseases and Parasites, by S. F. Snieszko, Glenn L. Hoffman, and Ken Wolf, 4 pp., June 1964.

SSR-Fish. No. 459 - The Fishery for Scup with Special Reference to Fluctuations in Yield and Their Causes, by William C. Neville and Gerald B. Talbot, 65 pp., illus., revised 1964.

SSR-Fish. No. 477 - North Pacific Oceanography, February-April 1962, by Felix Favorite and others, 69 pp., illus., February 1964.

SSR-Fish. No. 482 - Fish Population Studies, Lewis and Clark Lake, Missouri, 1956-1962, by Charles H. Walburg, 27 pp., June 1964.

Report of the Bureau of Commercial Fisheries for the Year 1962, 101 pp., illus., printed, 1964. During the calendar year 1962, it became increasingly apparent that the worldwide population explosion had resulted in a rapid expansion of the fisheries on all of the world's oceans as many nations sought protein from the seas for their people. The efforts of the Bureau of Commercial Fisheries to utilize wisely the nation's fishery resources cover a wide range of activities, from basic research in fields such as fishery biology and fish oil technology to practical applications such as demonstrations of fish cookery in schools and the dissemination of daily prices for fish landed in principal United States ports. The re-

port touches briefly on developments during 1962 in the domestic fisheries, Federal legislation pertaining to the industry, and international fishery matters. It also discusses principal Bureau accomplishments in fishery market promotion, products inspection, statistics collection, market news data, economic studies, vessel safety promotion, and other fields; financial assistance programs; shellfish genetic and fishery commodity studies; and cooperation with international, Federal, state, and other agencies. Included are discussions of the organization, employment, budget, and physical property of the Bureau; and publications written by its personnel. Appendixes contain statistics of United States fisheries; organizations with which the Bureau had contracts; and data on the Fisheries Loan Program.

THE FOLLOWING MARKET NEWS LEAFLETS ARE AVAILABLE FROM THE FISHERY MARKET NEWS SERVICE, U. S. BUREAU OF COMMERCIAL FISHERIES, RM. 510, 1815 N. FORT MYER DR., ARLINGTON, VA. 22209.

Number	Title
MNL- 8	- Portugal's Fishing Industry, 1963, 28 pp.
MNL-18	- Panama's Fishing Industry, 1963, 9 pp.
MNL-57	- Fisheries in the Federal Republic of Germany, 1963, 27 pp.

THE FOLLOWING PUBLICATIONS ARE AVAILABLE ONLY FROM THE SPECIFIC OFFICE MENTIONED.

California Fishery Market News Monthly Summary, Part I - Fishery Products Production and Market Data, June 1964, 15 pp. (Market News Service, U.S. Fish and Wildlife Service, Post Office Bldg., San Pedro, Calif. 90731.) California cannery receipts of tuna and tunalike fish and other species used for canning; pack of canned tuna, tunalike fish, mackerel, and anchovies; market fish receipts at San Pedro, Santa Monica, and Eureka areas; California and Arizona imports; canned fish and frozen shrimp prices; ex-vessel prices for cannery fish; for the month indicated.

California Fishery Market News Monthly Summary, Part II - Fishing Information, July 1964, 9 pp., illus., (U.S. Bureau of Commercial Fisheries, Biological Laboratory, P.O. Box 6121, Pt. Loma Station, San Diego, Calif. 92100.) Contains sea-surface temperatures, fishing and research information of interest to the West Coast tuna-fishing industry and marine scientists; for the month indicated. Includes an article, "Tagged bluefin tuna recovered off Japan."

California Fishery Products and Byproducts Brokers, Importers, and Exporters, 1964, 8 pp., July 1964. (Market News Service, U.S. Fish and Wildlife Service, Post Office Bldg., San Pedro, Calif. 90731.)

(Chicago) Monthly Summary of Chicago's Wholesale Market Fresh and Frozen Fishery Products Receipts, Prices, and Trends, June 1964, 18 pp. (Market News Service, U.S. Fish and Wildlife Service, U.S. Customs House, 610 S. Canal St., Rm. 1014, Chicago, Ill. 60607.) Receipts at Chicago by species and by states and provinces for fresh- and salt-water fish and shellfish; and weekly wholesale prices for fresh and frozen fishery products; for the month indicated.

Gulf of Mexico Monthly Landings, Production and Shipments of Fishery Products, June and July 1964, 8 pp., each. (Market News Service, U.S. Fish and Wildlife Service, Rm. 609, 600 South St., New Orleans, La. 70130.) Gulf States shrimp, oyster, finfish, and blue crab landings; crab meat production; LCL express shipments from New Orleans; wholesale prices of fish and shellfish on the New Orleans French Market; fishery imports at Port Isabel and Brownsville, Texas, from Mexico; Gulf menhaden landings and production of meal, solubles, and oil; and sponge sales; for the months indicated.

List of Primary Receivers of Imported Fishery Products and Byproducts at Houston, Tex., 1964, 2 pp., July 28, 1964. (Market News Service, U.S. Fish and Wildlife Service, Rm. 609, 600 South St., New Orleans, La. 70130.)

List of Primary Receivers of Imported Fishery Products at Miami, Fla., 1964, 3 pp., April 9, 1964. (Market News Service, U.S. Fish and Wildlife Service, Rm. 609, 600 South St., New Orleans, La. 70130.)

Monthly Summary of Fishery Products Production in Selected Areas of Virginia, North Carolina, and Maryland, June 1964, 4 pp. (Market News Service, U.S. Fish and Wildlife Service, 18 S. King St., Hampton, Va. 23369.) Landings of food fish and shellfish and production of crab meat and shucked oysters for the Virginia areas of Hampton Roads, Chincoteague, Lower Northern Neck, and Lower Eastern Shore; the Maryland areas of Crisfield, Cambridge, and Ocean City; and the North Carolina areas of Atlantic, Beaufort, and Morehead City; together with cumulative and comparative data on fishery products and shrimp production; for the month indicated.

New England Fisheries--Monthly Summary, June 1964, 22 pp. (Market News Service, U.S. Fish and Wildlife Service, 10 Commonwealth Pier, Boston, Mass. 02210.) Review of the principal New England fishery ports. Presents data on fishery landings by ports and species; industrial fish landings and ex-vessel prices; imports; cold-storage stocks of fishery products in New England warehouses; fishery landings and ex-vessel prices for ports in Massachusetts (Boston, Gloucester, New Bedford, Provincetown, and Woods Hole), Maine (Portland and Rockland), Rhode Island (Point Judith), and Connecticut (Stonington); frozen fishery products prices to primary wholesalers at Boston, Gloucester, and New Bedford; and Boston Fish Pier and Atlantic Avenue fishery landings and ex-vessel prices by species; for the month indicated.

New England Importers and Brokers of Imported Fishery Products, November 1963 , 9 pp. (Market News Service, U.S. Fish and Wildlife Service, 10 Commonwealth Pier, Boston, Mass. 02210.)

New York City's Wholesale Fishery Trade--Monthly Summary, May and June 1964, 19 pp. each. (Market News Service, U.S. Fish and Wildlife Service, 155 John St., New York, N.Y. 10038.) Includes summaries and analyses of receipts and prices on wholesale Fulton Fish Market, including both the salt- and fresh-water sections; imports entered at New York customs district; primary wholesalers' selling prices for fresh, frozen, and selected canned fishery products; marketing trends; and landings at Fulton Fish Market docks and Stonington, Conn.; for the months indicated.

New York City's Wholesale Fishery Trade, 1963 (Including Statistics and Marketing Trends), 47 pp. (Fishery Market News Service, U.S. Bureau of Commercial Fisheries, 155 John St., New York, N.Y.

10038.) The first part of this annual summary discusses fishery products receipts and marketing trends in the salt-water section of New York's wholesale Fulton Fish Market during 1963. The second section covers marketing trends and receipts in the fresh-water fish market (Peck Slip Area). The third part contains miscellaneous trends and developments: landings at Stonington, Conn., during 1963; monthly range of wholesale prices for fish meal, oil, and solubles at New York City, 1962/63. The fourth part presents a series of statistical tables giving receipts of fresh and frozen finfish and shellfish by species, states and provinces, and transport methods; imports at New York, 1962/63; receipts of finfish and shellfish by states; prices of fresh fishery products by months; and ex-vessel prices at Fulton Fish Market by species and months.

(Seattle) Washington and Alaska Receipts and Landings of Fishery Products for Selected Areas and Fisheries, Monthly Summary, July 1964, 9 pp. (Market News Service, U.S. Fish and Wildlife Service, 706 Federal Office Bldg., 909 First Ave., Seattle, Wash. 98104.) Includes Seattle's landings by the halibut and salmon fleets reported through the exchanges; landings of halibut reported by the International Pacific Halibut Commission; landings of otter-trawl vessels as reported by the Fishermen's Marketing Association of Washington; local landings by independent vessels; coastwise shipments from Alaska by scheduled and non-scheduled shipping lines and airways; imports from British Columbia via rail, motor truck, shipping lines, and ex-vessel landings; and imports from other countries through Washington customs district; for the month indicated.

MISCELLANEOUS PUBLICATIONS

THESE PUBLICATIONS ARE NOT AVAILABLE FROM THE FISH AND WILDLIFE SERVICE, BUT USUALLY MAY BE OBTAINED FROM THE ORGANIZATION ISSUING THEM. CORRESPONDENCE REGARDING PUBLICATIONS THAT FOLLOW SHOULD BE ADDRESSED TO THE RESPECTIVE ORGANIZATION OR PUBLISHER MENTIONED. DATA ON PRICES, IF READILY AVAILABLE, ARE SHOWN.

ABALONE:

"Abalone. . .Where it's found, how to process it," article, Fisheries Newsletter, vol. 23, no. 6, June 1964, pp. 19, 27, illus., printed. Fisheries Branch, Department of Primary Industry, Canberra, Australia. Discusses distribution, harvesting, and processing of abalone. Designed to assist fishermen searching for the mollusc.

AFRICA:

A Note on the Fisheries of Africa, 14 pp., printed, 1964. Food and Agriculture Organization of the United Nations, Viale delle Terme di Caracalla, Rome, Italy. A paper prepared for the 6th Session of the United Nations Economic Commission for Africa, Addis Ababa, held February 19-March 3, 1964.

AGAR-AGAR

"Preparation and properties of agar-agar from Indian seaweeds," by A. N. Kappanna and A. Visweswara Rao, article, Chemical Abstracts, vol. 59, August 19, 1963, 3717e, printed. American Chemical Society, 1155 16th St. NW., Washington, D. C. 20006.

"Soluble agar and carrageen gums," article, Food Manufacture, vol. 39, March 1964, p. 87, printed. Leonard Hill, Ltd., Stratford House, 9 Eden St., London NW1, England.

ALASKA:

1963 Alaska Commercial Fisheries Catch and Production Statistics, by Philip E. Chitwood, Statistical Leaflet No. 7, 28 pp., printed, July 1964. Alaska Department of Fish and Game, Subport Bldg., Juneau, Alaska.

ALGAE:

Chemistry of Blue-Green Algae (CYANOPHYCEAE), by G. K. Barashkov, OTS 62-32780, 10 pp., printed, August 1, 1962, $1.10. (Translated from the Russian, Botanicheskii Zhurnal, Akademiia Nauk SSSR, vol. 46, no. 3, pp. 447-454.) Office of Technical Services, U.S. Department of Commerce, Washington, D. C. 20230.

Chlorophyllase and Formation of an Atypical Chlorophyllide in Marine Algae, by J. Barrett and S. W. Jeffrey, 4 pp., illus., printed. (Reprinted from Plant Physiology, vol. 39, no. 1, January 1964, pp. 44-47.) Laboratory of Comparative Biology, Kaiser Foundation Research Institute, S. 14th St. and Cutting Blvd., Richmond, Calif.

AMINO ACIDS:

"Fish and fish products. Part V--Quantitative estimation of essential amino acids in fish protein through ion-exchange resin columns and paper chromatograms," by N. A. Khan and Kh. M. Quddusur Rahman, article, Scientific Researches, vol. 1, no. 2, April 1964, pp. 88-95, illus., printed, single copy 65 cents. East Regional Laboratories, P.C.S.I.R., Mirpur Rd., Dhamondi, Dacca-2, East Pakistan.

AQUARIUMS:

A Continuous Flow, Seawater Aquarium Suitable for Experimental Work With Live Marine Animals, by James E. Stewart and H. E. Power, Circular No. 13, 7 pp., illus., printed, 1963. Technological Research Laboratory, Fisheries Research Board of Canada, Halifax, N. S., Canada.

ARGENTINA:

Foreign Trade Regulations of Argentina, by Walter Haidar, OBR 64-56, 8 pp., printed, June 1964, 15 cents. Bureau of International Commerce, U. S. Department of Commerce, Washington, D. C. (For sale by the Superintendent of Documents, U. S. Government Printing Office, Washington, D. C. 20402.) Discusses Argentina's trade policy, import tariff system, sales and other internal taxes, documentation and fees, and labeling and marking requirements. Also covers special customs provisions, nontariff import controls, United States foreign trade controls, and Government representation between the two countries.

ATLANTIC OCEAN:

Scientific Conference on the Results of Oceanographic Investigations of the Atlantic Ocean, by K. A. Sedykh, OTS 63-21758, 16 pp., printed, May 7, 1963, 50 cents. (Translated from the Russian, Okeanologiia, vol. 3, no. 1, 1963, pp. 175-177.) Office of Technical Services, U. S. Department of Commerce, Washington, D. C. 20230.

THESE PUBLICATIONS ARE NOT AVAILABLE FROM THE FISH AND WILDLIFE SERVICE, BUT USUALLY MAY BE OBTAINED FROM THE ORGANIZATION ISSUING THEM.

AUSTRALIA:

"Navy and CSIRO co-operate to aid fisheries," article, Fisheries Newsletter, vol. 23, no. 5, May 1964, pp. 17, 19, illus., printed. Commonwealth Fisheries Office, Department of Primary Industry, Canberra, Australia. Describes the aims of Australian Navy oceanographic and survey cruises to be made this year. Gives details of the work being undertaken.

Tasmania Inland Fisheries Commission Report for the Year Ended 30th June 1962, 16 pp., printed 1962. Tasmania Inland Fisheries Commission, Hobart, Tasmania, Australia.

AUSTRIA:

Foreign Trade Regulations of Austria, by Catherine M. Kelley, OBR 64-57, 8 pp., printed, June 1964, 15 cents. Bureau of International Commerce, U. S. Department of Commerce, Washington, D. C. (For sale by the Superintendent of Documents, U. S. Government Printing Office, Washington, D. C. 20402.) Discusses Austria's trade policy, import tariff system, sales and other internal taxes, documentation and fees, and labeling and marking requirements. Also covers special customs provisions, nontariff import controls, United States foreign trade controls, and Government representation between the two countries.

BELGIUM:

Rapport Annuel sur l'Evolution de la Flotte de Peche en 1963 (Annual Report of the Status of the Fishing Fleet in 1963), 43 pp., processed in French. Administration de la Marine et de la Navigation Interieure, Ministere des Communications et des Postes, Telegraphes et Telephones, Brussels, Belgium.

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Investment Factors in the Republic of Korea, by Joyce C. Bachmann, OBR 64-58, 16 pp., printed, June 1964, 15 cents. Bureau of International Commerce, U. S. Department of Commerce, Washington, D. C. (For sale by the Superintendent of Documents, U.S. Government Printing Office, Washington, D. C. 20402.) A report of interest to businessmen considering an investment in the Republic of Korea. Korea offers a generally favorable Foreign Investment Encouragement Law, reinforced by the investment guaranty program of the U. S. Agency for International Development (AID). The report discusses prospects for and Government policy toward foreign investment; Government controls over industry; business organization; and taxation problems. Also covers capital availability and credit, labor conditions, basic economic facilities, and investment services. The text of the Foreign Investment Encouragement Law is included.

LAKE BAIKAL:

Lake Baikal and its Life, by M. Kozhov, Monographiae Biologicae, vol. 11, 351 pp., illus., printed, 1963, $10. Dr. W. Junk, The Hague, Netherlands.

MACKEREL:

"Chemical composition of mackerel (Rastrelliger canagurta) and changes in the nutritive value during storage," by D. J. Nazir and N. G. Magar, article, Indian Journal of Technology, vol. 1, no. 6, 1963, pp. 247-249, printed. Indian Journal of Technology, Hillside Rd., 12, Delhi, India.

MARINE AIDS:

Light List, Vol. V--Mississippi River System, 293 pp., illus., printed, 1964, $1.75. U.S. Coast Guard, Washington, D. C. (For sale by the Superintendent of Documents, U.S. Government Printing Office, Washington, D. C. 20402.) Contains a list of lights, fog signals, buoys, and daybeacons for the Mississippi River System of the United States, Second Coast Guard District.

MARINE ALGAE:

Excretion of Colored Ultraviolet-Absorbing Substances by Marine Algae, by J. S. Craigie and J. McLachlan, 11 pp., printed, 1964. (Reprinted from Canadian Journal of Botany, vol. 42, 1964, pp. 23-33.) Atlantic Regional Laboratory, Halifax, N.S., Canada.

Marine Red Algae of Pacific Mexico. Part 8--Ceramiales: Dasyaceae, Rhodomelaceae, by E. Yale Dawson 81 pp., printed, 1963. (Reprinted from Nova Hedwigia, vol. 4, no. 3, 1963, pp. 401-481.) Beaudette Foundation for Biological Research, Solvang, Calif.

MARINE MAMMALS:

"Los danos que causan los animales marinos depredadores en el Mediterraneo" (The damage caused by the predaceous marine mammals of the Mediterranean), by M. Ravel, article, Puntal, vol. 11, no. 122, May 1964, pp. 2-5, illus., printed in Spanish, single copy 12 ptas. (about 20 U. S. cents). Puntal, Apartado de Correos 316, Alicante, Spain.

MARYLAND:

"Several Maryland fishes are close to extinction," by Frank Schwartz, article, Maryland Conservationist, vol. 41, no. 3, May-June 1964, pp. 8-12, illus., printed, single copy 25 cents. Department of Game and Inland Fish, State Office Bldg., Box 231, Annapolis, Md. An account of nine freshwater forms and eight marine fishes whose abundance and presence have been drastically altered or eliminated by the effects of pollution sedimentation and drainage in Maryland. Among the marine fish mentioned are: sturgeon, shad, croaker, gray sea trout or weakfish, sheepshead, Spanish mackerel, and king whiting or kingfish.

MEETINGS AND PROCEEDINGS:

Proceedings of the Conference on Primary Productivity Measurement, Marine and Freshwater Held at University of Hawaii, August 21-September 6, 1961, edited by Maxwell S. Doty, 237 pp., illus., printed, 1961. University of Hawaii, Honolulu, Hawaii.

MOLLUSCS:

Molluscs, by John Edward Morton, 232 pp., illus., printed, 1960. Harper and Bros., 49 E. 33rd St., New York, N. Y.

"Molluscs," by Alan J. Kohn, article, Science, vol. 145, no. 3631, July 31, 1964, p. 518, printed, single copy 35 cents. American Association for the Advancement of Science, 1515 Massachusetts Ave. NW., Washington, D. C. 20005. Sensory, integrative, and effect or aspects of the responses of marine gastropods, cephalopods, and bivalves to significant aspects of environment were emphasized in a symposium on the molluscs. Discusses papers presented at the symposium.

MUSSELS:

Comparison of the growth of mussels (MYTILUS EDULIS) in the White Sea and Sea of Okhotsk, by A. I. Savilov, OTS 62-25386, 13 pp., processed, 1962, $1.60. (Translated from the Russian, Akademiia Nauk SSSR, Trudy Instituta Okeanologii, vol. 11, 1964, pp. 246-257.) Office of Technical Services, U.S. Department of Commerce, Washington, D. C. 20230.

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"Improving fishing nets made from synthetic materials," by K. P. Grinevich and others, article, Soviet Plastics, no. 11, 1960, pp. 16-17, printed. (Translated from the Russian Plasticheskie Massy, no. 11, 1960, pp. 18-19.) Palmerton Publishing Co., Inc., 101 W. 31st St., New York 1, N. Y.

Mono-Filament Gill Netting for Skipjack (Striped Tuna), 7 pp., processed, 1963. Hakodate Fishing Nets Mfg. Co. Ltd., 82, Seuhieo-cho, Hakodate, Japan.

NICARAGUA:
Foreign Trade Regulations of Nicaragua, by Rodney D. Anderson, OBR 64-62, 8 pp., printed, June 1964, 15 cents. Bureau of International Commerce, U. S. Department of Commerce, Washington, D. C. (For sale by the Superintendent of Documents, U. S. Government Printing Office, Washington, D. C. 20402.) Discusses Nicaragua's trade policy, import tariff system, sales and other internal taxes, documentation and fees, and labeling and marking requirements. The report also covers special customs provisions, nontariff import controls, the country's export controls, United States foreign trade controls, and Government representation between the two countries.

NORWAY:
Norway Exports, no. 2, Summer 1964, 79 pp., illus., printed. Export Council of Norway, H. Heyerdahls Gate, Oslo 1, Norway. Some aspects of Norway's fish processing industry, fishery byproducts, trawler-building yards, and export of vessels are featured in this issue. Canned fish, frozen fillets, margarine from fish oil, edible oil processing and use in canning, and 100 years of Norwegian whaling are all discussed. The delivery of seven complete fish meal plants to Chile is highlighted, as well as the construction and delivery of fishing vessels to Ghana and Kuwait.

NUTRITION:
"Metabolizable energy values and coefficients of digestibility for protein and fat of starfish meal and starfish meal combined with fish meal," by M. W. Stutz and L. D. Metterson, article, Poultry Science, vol. 43, March 1964, pp. 474-478, printed. Poultry Science Association, Kansas State College, Manhattan, Kans.

OCEANOGRAPHY:
Oceanic Observations of the Pacific, 1951, 635 pp., printed, 1963. University of California Press, Berkeley, Calif.

Oceanic Observations of the Pacific, 1956, 502 pp., printed, 1963. University of California Press, Berkeley, Calif.

Oceanographic Work of the Pacific Marine Fisheries and Oceanography Institute's Soviet-Viet Nam Scientific Explorative Expedition (Razlichie i skhodstvo biologicheskikh priznakov Belomorskikh sel'dei i Baltiiskoi salaki), by P. I. Dolgikh and N. A. Shurunov, OTS 63-21438, 36 pp., printed, March 20, 1963, $1.00. (Translated from the Russian, Okeanologiia, vol. 2, no. 2, 1962, pp. 368-371.) Office of Technical Services, U. S. Department of Commerce, Washington, D. C. 20230.

Pacific Ocean Scientific Research Institute of Marine Fishing and Oceanography (Tikhookeanskii nauchno-issledovatel'skii institut morskogo rybnogo khoziaistva i okeanografii--TINRO), by A. G. Kaganovskii, OTS 63-21559, 28 pp., printed, April 10, 1963, 75 cents. (Translated from the Russian Rybnoe Khoziaistvo, vol. 36, no. 7, 1960, pp. 23-26.) Office of Technical Services, U. S. Department of Commerce, Washington, D. C. 20230.

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Natural Resources of Oregon, 71 pp., illus., printed, 1964, 50 cents. Office of the Secretary, Division of Information, U. S. Department of the Interior, Washington, D. C. (For sale by the Superintendent of Documents, Government Printing Office, Washington, D. C. 20402.) Chapters in this booklet describe Oregon's history, physical characteristics, fish and wildlife, water and power, forests, agriculture, minerals, parks and recreation opportunities, Indians, and programs of Federal natural resource agencies in the State. The publication also profiles the industries, scenic beauty, and population which contribute to the State's resource potential. In reference to fisheries, mentions in particular salmon, trout, and spiny-rayed fish. Discusses the cooperative programs of the State of Oregon and the U. S. Fish and Wildlife Service for enhancing the quality and abundance of the State's fish. Illustrative photographs accompany each article.

OYSTERS:
Notes on the Biology and Commercial Use of the Chilean Oyster, by Luis Castillo and Zacarias Vergara, Translation Series No. 360, 29 pp., processed, 1961. (Translated from the Spanish, Apuntes Biolojicos e Industrias sobre la Ostra de Chile, Ministerio de Industria, Santiago, Chile, 1962, 59 pp.) Fisheries Research Board of Canada, Biological Station, St. Andrews, N. B., Canada.

PACIFIC OCEAN:
Certain Laws Governing the Dynamics of the Abundance of Commercial Fish in the North-Western Part of the Pacific Ocean, by P. A. Moiseev, Translations No. 108, 2 pp., printed, 1963. (Translated from the Russian, Trudy Soveshchanii, 1961.) Fisheries Laboratory, Department of Agriculture, Fisheries and Food, Lowestoft, Suffolk, England.

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Pennsylvania Fishes, 35 pp., illus., printed, 1964. Pennsylvania Fish Commission, South Office Bldg., Harrisburg, Pa. Contains 17 color photos and brief descriptions of fish found in Pennsylvania waters. Describes for each fish its range, characteristics, habits, and food. In addition, six species are illustrated with drawings. Discusses the trout, pike, catfish, perch, and sunfish families; and distinguishing Pennsylvania fishes.

PHYSIOLOGY:
"Behavior of dehydrogenase, erythrocytes, marrow and the crystalline lens of fish frozen at -8°," by Stefano Caracciolo and Constantino Petris, article, Chemical Abstracts, vol. 60, February 3, 1964, 3309e, printed. American Chemical Society, 1155 16th St. NW., Washington, D. C. 20006.

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"Behavior of dehydrogenases in fish products frozen at -30°," by Stefano Caracciolo and Guglielmo Pepe, article, Chemical Abstracts, vol. 60, February 3, 1964, 3421d, printed. American Chemical Society, 1155 16th St. NW., Washington, D. C. 20006.

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Marine Plankton--A Practical Guide, by G. E. Newell and R. C. Newell, 207 pp., illus., printed, 1964. Hutchinson's Biological Monographs, 178-202 Great Portland St., London W1, England.

POISONOUS FISH:
"Poison fish projects report," article, South Pacific Bulletin, vol. 14, no. 2, April 1964, pp. 51-54, illus., printed, single copy 30 cents. South Pacific Commission Publications Bureau, C.P.O. 5254, Sydney, Australia. Discusses investigations of ciguatera (toxic fish poisoning) in the Pacific since 1958. Covers the biology of the red snapper, considered to be the most consistently toxic fish in the tropical Pacific; food chain transmission of the toxin; toxins of other species of fish; chemical analyses of various toxins; pharmacology; native remedies; and epidemiology of ciguatera.

"Poisons from shellfish and puffer fish," by Edmund F. Murtha, article, Chemical Abstracts, vol. 60, February 17, 1964, 4501f, printed. American Chemical Society, 1155 16th St. NW., Washington, D. C. 20006.

POLAND:
"Statki rybackie dla malych portow polskiego wybrzeza" (Fishing vessels for Poland's small fishing harbors), by Bohdan Pradzynski, article, Budownictwo Okretowe, vol. 9, no. 5, May 1964, pp. 163-165, printed in Polish with English abstract. Budownictwo Okretowe, Wydawnictwa Czasopism Technicznych NOT, Warsaw, Czackiego 3/5, Poland. Discusses the fishing vessels to be operated in the future from Poland's small fishing harbors, the trends of the investment policies, and the characteristics of the fishing vessels needed.

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Breeding, Population, Dynamics, and Health of Fish, U.S.S.R., OTS 64-31188, 59 pp., illus., printed, April 30, 1964, $1.50. (Translated from the Russian, Voprosy Ikhtiologii, vol. 4, no. 1 (30), 1964.) Office of Technical Services, U.S. Department of Commerce, Washington, D. C. 20230.

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"Lunenburg's dream-plant comes true," by Allan T. Muir, article, Canadian Fisherman, vol. 51, no. 7, July 1964, pp. 10-16, illus., printed, single copy C$1. National Business Publications Ltd., Gardenvale, Que., Canada. The fish processing plant at Lunenburg, Nova Scotia, opened on June 24th, is discussed in this article. The new plant has a capacity of 80 million pounds of processed products annually. It also features push-botton systems for remote control of some operations in distant areas of the plant. The article covers the layout of the plant, the freezers, a pan-washing machine, the cooking and breading kitchen, and smoked fish operation. Also discusses a unique system for separating lean from oily fish offal. the fish meal plant, ice-handling operation, power plant, sea-water pumping station, employees' facilities, and other features of this new plant.

PROTEIN CONCENTRATE:
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A New Quick Electronic Method of Determining the Freshness of Sea Fish, by C. Hennings, 44 pp., printed, 1963. (Translated from the German, Zeitschrift der Lebensmittel-Untersuchung und Forschung, vol. 119, April 1963, pp. 461-477.) Fisheries Research Board of Canada, Sir Charles Tupper Bldg., Riverside Dr., Ottawa, Canada.

"Texture change in fish and its measurement," by R. M. Love, article, Texture in Foods, Torry Memoir no. 39, pp. 109-118, printed. Torry Research Station, Aberdeen, Scotland.

RADIATION PRESERVATION:
Application of Radiation-Pasteurization Process to Pacific Crab and Flounder--Final Summary for the Period November 1962 to November 1963, by D. M. Miyauchi and others, Report No. TID-19585, 152 pp., printed, November 1963, $3.50. Division of Isotopes Development, U.S. Atomic Energy Commission. (Available from Office of Technical Services, U. S. Department of Commerce, Washington, D. C. 20230.)

"Enzyme-inactivation studies on irradiation-sterilized cod fillets," by R. O. Sinnhuber and M. K. Landers, article, Journal of Food Science, vol. 29, no. 2, 1964, pp. 190-191, printed. Institute of Food Technologists, 510-522 N. Hickory St., Champaign, Ill.

"Irradiation helps fish industry," by R. Seiden, article, Food Manufacture, vol. 39, March 1964, p. 51, printed. Leonard Hill, Ltd., Stratford House, 9 Eden St., London NW1, England.

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RADIOACTIVITY:
"Radioactivity and its relationship to oceanic food chains," by Charles Osterberg, William G. Pearcy and Herbert Curl, Jr., article, Journal of Marine Research, vol. 22, no. 1, January 15, 1964, pp. 2-12, illus., printed, $3.50. Sears Foundation for Marine Research, Bingham Oceanographic Laboratory, Yale University, New Haven, Conn.

ROCKFISH:
Life History Studies on Ten Species of Rockfish (Genus SEBASTODES), by Julius B. Phillips, Fish Bulletin

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126, 69 pp., illus., printed, 1964. Documents Section, P.O. Box 1612, Sacramento, Calif. 95807. Discusses importance of the fishery, materials and methods used in this study, weight-length relationships, age changes, reproduction, feeding habits, and racial studies. Also describes in detail the 10 species studied: the bocaccio; the chilipepper; and the yellowtail, canary, vermilion, widow, dark-blotched, splitnose, stripetail, and shortbelly rockfish.

SALMON:

Feeding of Young Salmon, SALMO SALAR L. Raised in Ponds in Early Developmental Stages, by J. B. Bogdanova, JPRS 19772, 7 pp., printed, 1962. (Translated from the Russian, Voprosy Ikhtiologii, vol. 2, no. 1 (22), pp. 169-173.) Office of Technical Services, U.S. Department of Commerce, Washington, D.C. 20230.

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"Quality of the spawning bed as it relates to survival and growth of pink salmon embryos and alevins and time of fry emergence," by William J. McNeal, article, Proceedings of the XVI International Congress of Zoology, vol. 1, 1963, p. 242, printed. Permanent Committee of International Zoological Congresses, Secretary (Pierre Grasse), 105 Blvd. Raspail, Paris 6, France.

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Sound Detection in Teleost Fishes, by J. Wodinsky and W. N. Tavolga, 12 pp., printed, 1964. (Reprinted from Marine Bio-Acoustics-Proceedings of a Symposium held at Bimini, Bahamas, April 1963, pp. 269-280.) The American Museum of Natural History, Central Park W. at 79th St., New York 24, N. Y.

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Summer Food of Juvenile American Shad in Virginia Waters, by William H. Massmann, 5 pp., illus., printed. (Reprinted from Chesapeake Science, vol. 4, no. 4, December 1963, pp. 167-171.) Sport Fishing Institute, Bond Bldg., Washington, D. C. 20005.

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"Ships, scientists in a broad study of S. A. fish resource," article, The South African Shipping News and Fishing Industry Review, vol. 19, no. 5, May 1964, pp. 97, 99, 101, 103, illus., printed, single copy 30 cents (about 42 U. S. cents). Thomson Newspapers, South Africa (Pty.) Ltd., P. O. Box 80, Cape Town, South Africa Republic. Discusses the research program of the Division of Sea Fisheries and its substantial changes in the last year in order to ensure the best possible use of its vessels in studying South Africa's commercial fish and their ocean environment.

SPINY LOBSTERS:
"Report on South African rock lobsters. Part I--Notes on the reproductive biology and size limit of S. A. rock lobsters," by A. E. F. Heydorn, article, The South African Shipping News and Fishing Industry Review, vol. 19, no. 5, May 1964, pp. 89, 91, 93, 95, illus., printed, single copy 30 cents (about 42 U. S. cents). Thomson Newspapers, South African (Pty.) Ltd., P. O. Box 80, Cape Town, South Africa Republic. This article deals with the determination of the size at which the South African rock lobster Jasus lalandii attains sexual maturity and with the reproductive potential of this species at various stages in its growth. The biological implications of a reduction in the minimum legal size limit are discussed.

"Temperatures in cartons of live rock lobsters," by R. A. Harvey, article, Annual Report 1962, Fishing Industry Research Institute, p. 18, illus., printed, Fishing Industry Research Institute, Cape Town, South Africa Republic.

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ENOPLOTEUTHIS ANAPSIS, a New Species of Enoploteuthid Squid (Cephalopoda: Oegopsida) from the Atlantic Ocean, by Clyde F. E. Roper, Contribution No. 521, 9 pp., illus., printed, 1964. (Reprinted from Bulletin of Marine Science of the Gulf and Caribbean, vol. 14, no. 1, March 1964, pp. 140-148.) The Marine Laboratory, Institute of Marine Science, University of Miami, 1 Rickenbacker Causeway, Miami 49, Fla.

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Underwater Observations During the Fifth Voyage of the Submarine SEVERYANKA, by O. A. Sokolov, OTS 62-19789, 28 pp., printed, February 19, 1962, $2.60. (Translated from the Russian Okeanologiia, vol. 1, no. 4, 1961, pp. 757-761.) Office of Technical Services, U. S. Department of Commerce, Washington, D. C. 20230.

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Fishing Sampans in Taiwan, by Han-po Lui, 82 pp., illus., printed in Chinese with English summary, 1963. Taiwan Fisheries Bureau, Department of Agriculture and Forestry, Provincial Government of Taiwan, Taipei, Taiwan.

"Tuna industry of Taiwan," by C. C. Yang, article, Industry of Free China, vol. 21, no. 2, February 25, 1964, pp. 2-21, printed. Industry of Free China, 118 Huai Ning St., Taipei, Taiwan. The first part of this article discusses the outlook of the world tuna fishery--characteristics of tuna fishing, background and current situation, international trade, features of the Japanese tuna trade, and resource and marketing problems affecting future fishery development. Part 2 gives a brief history of Taiwan tuna fishing--expansion of the fleet after 1955; part 3 covers the present situation in Taiwan and some economic problems of the fishery, Singapore and Penang-based operations, and future fishing plans off Madagascar and Malaysia; part 4 presents conclusions and recommendations. "It is generally agreed that future expansion should not be planned exclusively on the basis of export but should be supported by a high level of consumption at home in view of the world market situation," states the author.

TARIFFS AND TRADE:
GATT--What It is. . .What It Does. . .How It Works, 22 pp., printed, 1964. The Information and Library Services, GATT Secretariat, Villa Le Bocage, Palais des Nations, Geneva 10, Switzerland.

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THAILAND:

Foreign Trade Regulations of Thailand, by Dawn A. Wachtel, OBR 64-54, 8 pp., printed, June 1964, 15 cents. Bureau of International Commerce, U. S. Department of Commerce, Washington, D. C. (For sale by Superintendent of Documents, U.S. Government Printing Office, Washington, D. C. 20402.) Discusses Thailand's trade policy, import tariff system, sales and other internal taxes, documentation and fees, and labeling and marking requirements. The report also covers special customs provisions, nontariff import controls, the country's export controls, United States foreign trade controls, and Government representation between the two countries. The import of some fishery products into Thailand is regulated by Government authorities.

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Electrical Resistance Thawing of Fish, by H. R. Sanders, Torry Memoir No. 143, 5 pp., printed, 1963. Torry Research Station, Aberdeen, Scotland.

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Course for Apprentice Fishermen, edited and compiled by "World Fishing," 92 pp., illus., printed, 8s. 6d. (about US$1.20). Grampian Press Ltd., The Tower, 229-243 Shepherds Bush Rd., Hammersmith, London W6, England. Contains a series of articles previously published individually in the periodical World Fishing. In addition, there is a chapter on stern trawling. Subjects covered include, among others, the trawler's basic points; how the trawl works; danger on deck; first steps in net mending; blocks and tackles; and the net store. Also covered are gutting, stowing, and icing; handling a ship; the compass; understanding charts; courses and bearings; radio navigation aids; rules of the road; and safety and survival.

TRAWLERS:

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TROUT:

"On the tolerance of rainbow trout, Salmo gairdneri irideus Gibbons, to salt water," by T. Awakura, article, Suisan Fukajo Kenkyu Hokoku, vol. 17, December 1962, pp. 41-48, printed in Japanese. Hokkaido Fish Hatchery, Fisheries Agency, Nakanoshima, Outskirt of Sapporo, Hokkaido, Japan.

"Some observations on the breeding of rainbow trout, Salmo gairdneri irideus Gibbons, in salt water," by T. Awakura and others, article, Suisan Fukajo Kenkyu Hokoku, vol. 17, December 1962, pp. 49-57, printed in Japanese. Hokkaido Fish Hatchery, Fisheries Agency, Nakanoshima, Outskirt of Sapporo, Hokkaido, Japan.

"Utilization of lipids by fish. I--Fatty acid oxidation by tissue slices from dark and white muscle of rainbow trout (Salmo gairdneri)," by E. Bilinski, article, Canadian Journal of Biochemistry and Physiology, vol. 41, January 1963, pp. 107-112, printed. Division of Administration and Awards, The National Research Council, Sussex St., Ottawa 2, Canada.

TUNA:

"Body temperature of yellowfin and skipjack tunas in relation to sea surface temperature," by Izadore Barrett and Frank J. Hester, article, Nature, vol. 203, no. 4940, July 4, 1964, pp. 96-97, illus., printed, single copy 4s. (about 55 U.S. cents). St. Martin's Press, Inc., 175 Fifth Ave., New York 10, N. Y.

"Considerações práticas sobre o enverdecimento do atum tropical (1)" (Practical considerations on development of green meat in tropical tuna), by J. F. Aldrin, article, Conservas de Peixe, vol. 19, no. 219, June 1964, pp. 15-17, printed in Portuguese. Sociedade da Revista Conservas de Peixe, Lda., Regueirao dos Angos, 68, Lisbon, Portugal.

"Migration of a tagged bluefin tuna across the Pacific Ocean," by Craig J. Orange and Bernard D. Fink, article, California Fish and Game, vol. 49, no. 4, 1963, pp. 307-309, printed. Printing Division, Documents Section, No. Seventh St. at Richards Blvd., Sacramento, Calif. 95814.

"Preliminary age determination of bluefin tuna, Thunnus thynnus," by Robert R. Bell, article, California Fish and Game, vol. 49, no. 4, 1963, p. 307, printed. Printing Division, Documents Section, No. Seventh St. at Richards Blvd., Sacramento, Calif. 95814.

UNDERWATER PHOTOGRAPHY:

"Combination camera and bottom-grab," by K. O. Emery and A. S. Merrill, article, Oceanus, vol. 10, no. 4, June 1964, pp. 2-7, illus., printed. The Woods Hole Oceanographic Institution, Woods Hole, Mass. The identification of animals shown on bottom photographs has been a problem. This difficulty has been solved by combining a bottom sampler as a source of specimens and a camera to view ecological relationships at the same site.

"A wide-angle attachment for underwater photography with 16 mm. motion-picture camera," by A. S. Lodkin, article, USSR Industrial Development: Soviet Precision Equipment, No. 50, OTS 63-13642, 38 pp., printed, December 26, 1962, $3.60. (Translated from the Russian, Tekhnika Kino i Televideniia, vol. 6, no. 9, 1962, pp. 3-19.) Office of Technical Services, U. S. Department of Commerce, Washington, D. C. 20230.

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Government Publications--Department of Agriculture and Fisheries for Scotland, Sectional List No. 52, 23 pp., printed, revised to March 31, 1963. Her Majesty's Stationery Office, London, England. (For sale by British Information Services, 845 Third Ave., New York, N. Y. 10022.)

Government Publications--Fisheries, Sectional List No. 23, 11 pp., printed, revised to March 13, 1962. Her Majesty's Stationery Office, London, England. (For sale by British Information Services, 845 Third Ave., New York, N. Y. 10022.)

THESE PUBLICATIONS ARE NOT AVAILABLE FROM THE FISH AND WILDLIFE SERVICE, BUT USUALLY MAY BE OBTAINED FROM THE ORGANIZATION ISSUING THEM.

Journal of the Marine Biological Association of the United Kingdom, vol. 44, no. 2, June 1964, 278 pp., illus., printed, $13.50. Cambridge University Press, 32 E. 57th St., New York 22, N.Y. Includes, among others, the following articles: "Line-fishing of the continental slope," by G.R. Forster; "Observations on the fertility of the oyster (Ostrea edulis)," by P.R. Walne; "The feeding of plaice and sand-eel larvae in the southern North Sea," by J.S. Ryland; and "A revised check-list of British marine algae," by Mary Parke and P.S. Dixon.

Sea Fisheries Statistical Tables, 1963, 46 pp., printed, 1964, 5s. (about 70 U.S. cents). Ministry of Agriculture, Fisheries and Food, London, England. (Available from Sales Section, British Information Services, 845 Third Ave., New York, N.Y. 10022.) Includes statistics on fish of British taking, imports and exports, and demersal and pelagic landings.

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The Effect of the Fishing Industry on the Biological Characteristics of Fish (from Archeological Records), by V.D. Lebedev, Translations No. 114, 10 pp., printed, 1963. (Translated from the Russian, Trudy Soveshchan.) Fisheries Laboratory, Department of Agriculture, Fisheries and Food, Lowestoft, Suffolk, England.

Fishes of the Northern Seas of the U.S.S.R. (Ryby severnykh morei SSSR), by A.P. Andriyashev, OTS 63-11160, 621 pp., illus., processed, 1964, $6.25. (Translated from the Russian, Keys to the Fauna of the U.S.S.R., No. 53, Zoological Institute of the U.S.S.R. Academy of Sciences, Moscow, U.S.S.R., 1954.) Office of Technical Services, U.S. Department of Commerce, Washington, D.C. 20230.

Fishing Economy, 1960, OTS 63-21559, 28 pp., printed, April 10, 1963, 75 cents. (Translated from Russian.) Office of Technical Services, U.S. Department of Commerce, Washington, D.C. 20230.

Rybnoe Khoziaistvo, vol. 40, no. 6, June 1964, 96 pp., illus., printed in Russian, single copy 50 Kopecks (about 56 U.S. cents). Rybnoe Khoziaistvo, B-140, V. Krasnosel'skaia 17, Moscow, U.S.S.R. Includes, among others, these articles: "From the speech of the Chairman of the Federal Fisheries Committees at the Conference of Young Far East Fishermen;" "The formation of cod stocks in the waters off western Greenland," by M.A. Pavlov; "The effect of transport conditions on the survival rate of mussels," by A.I. Ivanov; "Our experience with large-scale sturgeon farms in Azerbaidzhan," by M. Ramazanov; "The fish caught by our vessel is the cheapest of all fish caught by the Murmansk trawler fleet," by L.N. Gruzdev; "The rules of signaling and movement for fishing vessels when engaged in joint operations (with vessels of other countries)," by N.S. Goriunov; "How to decrease the time needed to repair vessels and increase the quality of work," by L.G. Glazkov and others; "Improved trawl used in herring fishery by medium fishing trawlers (SRT) with 300 and 400 hp.," by A.V. Chentsov; "Develop and perfect the midwater pair trawling (Georges Bank)," by S.E. Shevtsov; "Herring fishing with purse seines from refrigerated medium trawlers (SRTR-400)," by A.I. Kostin; "Fishing without nets for Black Sea anchovy," by E.G. Sharapov; "New successes of Sakhalin fishery kolkhozes," by A.A. Taranov; "Dietetic canned fish with vegetables," by G.S. Korobkina and M.D. Bogoslovskaia; "Rational exploitation of natural sources of vitamin A," by G.A. Dolbish; "Economic efficiency of Baltic herring processing," by L. Bulkin; "Party and economic meeting of Black Sea and the Sea of Azov fishery workers;" and "Device for fishing (which regulates various depths of drift nets)," by V.P. Ivashov and others.

--M.A. Kravaja

Rybnoe Khoziaistvo, vol. 40, no. 7, July 1964, 96 pp., illus., printed in Russian, single copy 50 Kopecks (about 56 U.S. cents). Rybnoe Khoziaistvo, B-140, V. Krasnosel'skaia 17, Moscow, U.S.S.R. Includes, among others, these articles: "Present status and future prospects for the construction of fishing vessels," by G.B. Terent'ev; "The fishing industry of the Far East in the new stage of development," by S.H. Nadibaidze; "We must better exploit the resources of the Northern fishing basin," by A.I. Filippov; "Butterfish (Poronotus)," by A.A. Dubovitskii; "Biological basis of the ichthyofauna reconstruction of the Riga Gulf," by V.S. Tanasiichuk; "Smooth-spined grenadier (Macrourus berglax); its chemical composition and utilization," by E.F. Kleie; "Manufacturing of sausages from frozen yellowfin tuna," by Z.A. Iakovleva and G.S. Khristoferzen; "The effect of angle parameters of the knife on the cutting force during slicing of (tuna) fish," by M.A. Iakubov; "Utilization of Bering Sea shrimp," by V.S. Gordievskaia; "Distribution of pelagic larvae of the Kamchatka crab in the waters of western Kamchatka," by R.R. Makarov; "Our experiences with the tagging of the Pacific navaga (Eleginus gracilis) in the Tauiskaia Inlet." by B.A. Gritsenko; "Commercial testing of automated trawl boards," by V. Novofastovskii; "Electrofishing for Azov (Sea) anchovy," by I.I. Luzanov; "Economic efficiency of the utilization of production refrigerators in the trawling operation in the Barents Sea," by V.I. Zakurdaev; "Problems in calculating costs in the fishing industry," by L.M. Guzhavina; and "Evaporating plant on the whaling factory-ships Vladivostok and Dalnii Vostok," by B.M. Rogalev.

--M.A. Kravaja

WEATHER CHARTS:

The following processed weather charts are published by the Weather Bureau, U.S. Department of Commerce, Washington, D.C., and are for sale by the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402, 10 cents each. Charts show stations displaying small craft, gale, whole gale, and hurricane warnings; explanations of warning displays; and schedules of AM and FM radio, TV, and radiophone stations that broadcast weather forecasts and warnings.

Canadian Border to Eureka, Calif., and Alaska, 1964.

Eureka to Point Conception, Calif., 1964.

Hawaiian Islands, 1964.

Morgan City, La., to Apalachicola, Fla., 1964.

THESE PUBLICATIONS ARE NOT AVAILABLE FROM THE FISH AND WILDLIFE SERVICE, BUT USUALLY MAY BE OBTAINED FROM THE ORGANIZATION ISSUING THEM.

WHALE MEAT:

"Nutritive value of whale meat," by Takashi Kaneda, Hisae Sakai and Seinosuke Ishii, article, Chemical Abstracts, vol. 59, November 11, 1963, 11965g, printed, American Chemical Society, 1155 16th St. NW., Washington, D. C. 20006.

WHALES:

"La caza de cachalotes en el Peru: estadisticas de captura para los años 1947-1961 y un intento de analizar las condiciones de la poblacion en el periodo 1954-1961" (The catch of sperm whales in Peru: statistics of capture for the years 1947-1961 and an analysis of the conditions of the population in the period 1954-1961), by G. Saetersdal, J. Mejia, and P. Ramirez, article, Boletin, vol. 1, no. 3, 1963, pp. 45-84, printed in Spanish. Instituto de Investigacion de los Recursos Marinos, La Punta, Callao, Peru.

Periodicity of Humpback Whale Feeding in the South Atlantic Ocean, by M. V. Ivashin, OTS 63-21443, 8 pp., printed, March 28, 1963, 50 cents. (Translated from the Russian, Biulleten' Moskovskoe Obshchestvo Ispytatelei Prirody, Otdel Biologicheskii, vol. 36 (66), no. 6, 1961, pp. 110-115.) Office of Technical Services, U. S. Department of Commerce, Washington, D. C. 20230.

The Scientific Reports of the Whales Research Institute, no. 18, 189 pp., illus., printed, March 1964. The Whales Research Institute, 12-4 Tsukishima Nishigashidori, Chuo-ku, Tokyo, Japan. Includes, among others, the following article: "Fin whale subpopulations in the Antarctic whaling areas II, III, and IV," by K. Fujino; "Examination on age determination of the fin whale," by S. Ohsumi; and "Squids as the food of sperm whales in the Bering Sea and Alaskan Gulf," by T. Okutani and T. Nemoto.

The 20-Cycle Signals and Balaenoptera (Fin Whales), by W. E. Schevill, W. A. Watkins, and R. H. Backus, Contribution No. 1393, 6 pp., printed, 1963. (Reprinted from Marine Bio-Acoustics - Proceedings of a Symposium held at Bimini, Bahamas, April 1963, pp. 147-152.) Woods Hole Oceanographic Institution, Woods Hole, Mass.

WHALING:

"One hundred years of Norwegian whaling--The start and the first year," by Asbjorn Bakken, article, Norsk Hvalfangst-Tidende (The Norwegian Whaling Gazette), vol. 53, no. 5, May 1964, pp. 122, 124-128, 130-132, 134-137, illus., printed in Norwegian and English. Hvalfangerforeningen, Sandefjord, Norway.

"Whales and whaling," article, Norsk Hvalfangst-Tidende (The Norwegian Whaling Gazette), vol. 53, no. 4, April 1964, pp. 85-88, printed. Hvalfangerforeningen, Sandefjord, Norway. An excerpt from the Annual Report of the National Oceanographic Council for the period April 1, 1962-March 31, 1963. "Broadly the findings are that blue and humpback whales have been reduced to so small a remnant of the original stocks that only total protection for an indefinite period will allow them to recover, and that although there is a much larger surviving stock of fin whales, that too is declining and a drastic reduction of catching, to about a quarter of the present level, is needed for the stock to begin its recovery," states the article.

"Whales and whaling in the Western Pacific," by R. J. A. W. Lever, article, South Pacific Bulletin, vol. 14, no. 2, April 1964, pp. 33-36, illus., printed, single copy 30 cents. South Pacific Commission Publications Bureau, G. P. O. 5254, Sydney, Australia. Gives an account of whaling activities in Melanesia and Polynesia from 1789 to 1860. Discusses the early history of whaling in the area, types of whales hunted, main whaling grounds and island bases, the spouting of whales, use of whale teeth (ivory) for making jewelry, and decline of the industry in the Pacific.

"Whaling in the Antarctic in season 1962/63," article, Norsk Hvalfangst-Tidende (The Norwegian Whaling Gazette), vol. 52, no. 9, September 1963, pp. 249-252, 255-256, 259-262, 265-274, illus., printed. Hvalfangerforeningen, Sandefjord, Norway.

WHITEFISH:

"Age and growth of the round white fish in Lake Michigan," by Donald Mraz, article, Transactions of the American Fisheries Society, vol. 93, no. 1, 1963, pp. 46-52, printed. American Fisheries Society, 1404 New York Ave. NW., Washington, D. C. 20005.

"On the competition between whitefish species," by Thorolf Lindstrom and Nils-Arvid Nilsson, article, The Exploitation of Natural Animal Populations. A Symposium, 1960, pp. 326-340, printed, 1962. John Wiley and Sons, Inc., 605 3rd Ave., New York, N. Y.

White Fish Authority, Annual Report and Accounts for the Year Ended 31st March 1964, 54 pp., illus., printed, June 1964, 4s. (about 55 U. S. cents). Her Majesty's Stationery Office, York House, Kingsway, London WC2, England. Covers production, distribution and marketing, research and development, and administration of white fish fisheries.

WORLD PRODUCTION:

"Marine fish production: A world-wide view," by C. P. Idyll, article, Proceedings of the International Congress of Zoology, vol. 16, no. 4, 1963, pp. 330-335, printed. Secretary, Permanent Committee of International Zoological Congresses, 105 Blvd. Raspail, Paris 6, France.

FISH 'N SEAFOOD PARADE

The new emblem for "Fish 'n Seafood" promotions. Reproduction proofs for use in promotion pieces, food store newspaper ads, etc., are available from the National Fisheries Institute.

A month-long campaign to promote the sale of fishery products got under way October 1, 1964. Theme of the promotion: "Fish 'n Seafood Parade." Its sponsor: the National Fisheries Institute, 1614 20th Street NW., Washington, D. C.

Many food stores and chain stores, dealers, retailers, etc., tied in their advertising into the "Fish 'n Seafood Parade" promotion.

The Shrimp Association of the Americas also featured October as the time for "Shrimp Fiesta."

OCTOBER
SHRIMP FIESTA
can put shrimp glamour into your menu... extra profits into your till
Here are five tempting ways to take advantage of the high customer-preference for shrimp. And, in addition, you get natural portion control with low preparation cost and high mark-up.
Radio, TV and newspapers will be telling your customers that October is Shrimp Fiesta Month. It's easy to tie in with this extra-profit promotion. Serve shrimp throughout October ... and all year long.
Start extra profits marching your way with the FISH 'N SEAFOOD PARADE throughout October
SHRIMP
America's Popular Seafood
Serve It Everyday

Advertisement used by Shrimp Association of the Americas to promote shrimp during "Fish 'n Seafood" month in October 1964.

USE OF MANATEES TO CONTROL AQUATIC WEEDS

A three-year study of manatees or sea cows and their usefulness in controlling aquatic weeds has been launched by the Central and Southern Florida Flood Control District (FCD), according to a June 23, 1964, press release issued by that agency.

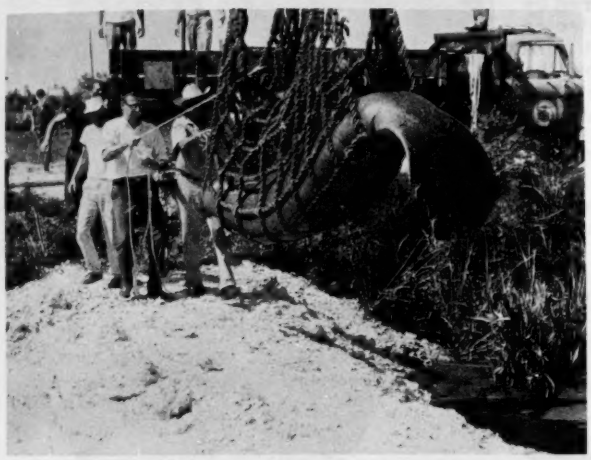

Fig. 1 - At the test site, manatee is lowered carefully into canal which has been blocked with an earthem dam, foreground. A quarter-mile section has been fenced off for the initial tests to see how fast the mammals will eat the vegetation in this waterway. Later they'll be put to work in other sections of canals.

Five of the cumbersome mammals (which can grow to more than 12 feet in length and weigh more than a ton) were netted in the Miami River and placed (on May 7) in a sturdily fenced sector of a canal where weed growth is typical.

Scientists from Florida Atlantic University at Boca Raton are directing the study, under contract from the Flood Control District. The FCD will pay $34,000 to the University to find out just how many weeds manatees can eat, to study their rate of reproduction, and to learn whether or not the mammals can be used practically and economically as a means of biological weed control.

For more than two years FCD officials have been investigating the possible use of the mammals. They have been gleaning all the information available. Oddly, scientists know very little about manatees, except that they are strict vegetarians, and they apparently consume vast quantities of weeds. Most authorities consulted by the FCD strongly urged sponsorship of the pilot study which is now under way.

The Executive Director of the 18-county FCD notes that present chemical and mechanical methods of weed control are costly. The FCD is spending $140,000 a year to keep its canals clear of obnoxious vegetation. But the FCD system, which now includes more than 1,300 miles of canals, is only 40 percent completed. The Director predicts that ultimately the FCD will have to spend $500,000 a year on weed control--unless some new method is discovered to cut costs or do a better job.

The water hyacinth (with its lovely purple blooms) is only one of a number of weeds which, if left uncontrolled, would soon multiply, spread, and choke the arteries that carry flood waters in rainy seasons, irrigation and municipal supplies in dry times.

FCD boat crews operating throughout the 15,000 square miles of the District are now using chemical sprays to control the hyacinth and the large-leaved water lettuce. But those two types of "floating" aquatics don't really pose as serious problems as do the submerged weeds. Four principal types of underwater weeds--elodea, coontail, southern naiad, and alligator weed--are infinitely more troublesome, because there is no practical or economical way to control them with chemicals.

The District uses a mechanical plow (actually a large steel A-frame) to uproot the underwater weeds. The "plow" is dragged along canal bottoms by an amphibious "duck," a surplus military vehicle. Draglines are used to remove the uprooted weeds from canals. But the FCD has to do the job over and over again, about once every 4 months.

(continued on next page)

Since some authorities are concerned about the long-range possible side-effects of continued use of chemical herbicides, a means of biological weed control might well be preferred, if practical.

Loaded into wooden boxes, filled with water, the manatees were transferred by trucks from the Seaquarium to the selected FCD canal. They are now busily at work eating weeds. And watching them from the canal banks is an assistant professor of Florida Atlantic University, who is directing the study program. Also watching from the banks are officers of the Florida Board of Conservation. The manatee is protected under Florida law, and a stiff fine and jail term await anyone who molests or kills one.

A July 16 letter from the FCD points out: "It became obvious earlier this month that they are doing an excellent job of clearing the canal and we expect to move them or release them to another reach of the canal. . . ."

It's hoped that the new study will help in preservation of the manatee--now threatened with possible extinction--as well as providing a new answer to weed control problems in Florida. (News Release, June 23, 1964, Central and Southern Florida Flood Control District, West Palm Beach, Fla.)

Note: See Commercial Fisheries Review, April 1960 p. 5.

Fig. 2 - Close-up of a manatee or sea cow in a cargo net, being transferred from a tank at the Miami seaquarium to a truck for transfer to the test sector of the canal.

SHARKS CAN DETECT PREY BY VIBRATION

"Sharks can sense their prey by vibration at a distance of a quarter of a mile. After this they rely on their sense of smell, and at 50 feet, they begin to use their eyes. At 10 feet, vision is their primary sense." This statement was made by a Professor of Zoology at Cornell University, at the ANZAAS Conference in Canberra, Australia, on the technique of operating on living sharks and current investigations of their heart and sense organs. Considerable work on sharks is done at the Lerner Marine Laboratory of the American Museum of Natural History at Bimini, in the Bahamas. Sharks measuring up to 17 feet long are maintained there for experimental and behavioral study in three pens constructed of stainless steel chain-link fencing. (Fisheries Newsletter, Canberra, Australia, April 1964.)

BLUENOSE--CANADA'S MOST FAMOUS SAILING VESSEL

Bluenose, Canada's most famous sailing vessel, was built in 1921 to challenge for the International Fishermen's Trophy--won the previous year by the United States schooner Esperanto. Bluenose regained the Cup for Canada in the first Series she sailed. She never once relinquished it throughout a keenly contended career, spanning two decades. She finally had to be sold, and ended her days as a freighter among the islands of the West Indies. She struck a Haitian reef and sank in 1946. Bluenose II was launched on July 24, 1963, from the same shipyard at Lunenburg that had constructed her predecessor. Bluenose II was created with two purposes in mind: (1) as the most fitting of memorials to a great ship; (2) as a goodwill ambassador and symbol of Nova Scotian hospitality. She is in all details of sail-plan and hull identical to the original Bluenose.

SAIL PLAN

1. Jib topsail
2. Jib
3. Jumbo
4. Foresail
5. Fore gaff-topsail
6. Fisherman's staysail
7. Mainsail
8. Main gaff-topsail

DIMENSIONS

Overall Length	143'
Beam	27'
Waterline	112'
Depth Main Hatch	11'6"
Draught	15'10"
Mainmast, above Deck	81'
Foremast, above Deck	73'
Main-topmast, overall	53'6"
Fore-topmast, overall	48'6"
Sail area, including Fisherman's Staysail, approximately	10,900 sq.ft.
Mainboom	81'
Maingaff	51'
Foreboom	32'6"
Foregaff	32'6"
Displacement	285 tons

The schooner Bluenose II under full sail.

IMPORTANT NOTICE

Due to an unexpected mix-up in the mailing of the June 1964 issue of the magazine, there are probably a number of subscribers who did not receive that issue. If you are one of those who did not receive that issue, write us for a copy.

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